ELECTRICAL REVIEW

Managing Editor: HUGH S. POCOCK, M.I.E.E.
Technical Editor: C. O. BRETTELLE, M.I.E.E.
Industrial Editor: J. H. COSENS

26th November, 1948

Contents

EDITORIAL—
Congestion at the Fair . . . 811

ARTICLES—
Fertilizer Granulation 813
Meters and Clocks 821
Industry and the House. By F. J. Erroll, M.A., A.M.I.E.E., M.P. . . 827
Metal Prices 831

REPORTS—
Voltage Reference Tube . . . 817
Electricity Statistics 823
Industrial Gas Turbines . . . 829
London Medical Exhibition . . . 830
Bicycle and Motor Cycle Show . . 830
Shenfield Scheme 832
Central London Line . . . 832

REPORTS—*continued*—
Overseas Electrical Trade . . . 837
New Zealand Market . . . 841

NEWS SECTIONS
Personal and Social, 824; Parliamentary, 828; Commerce and Industry, 833; Financial, 840; Electricity Supply, 843; Contracts, 847.

VIEWS ON THE NEWS . . . 818
CORRESPONDENCE 819
NEW BOOKS 839
NEXT WEEK'S EVENTS . . . 844
NEW PATENTS 845
Classified Advertisements 63
Index to Advertisers 78

EDITORIAL, ADVERTISING & PUBLISHING OFFICES: Dorset House, Stamford St., London, S.E.1
Telegraphic Address: "Elecrev, Sedist, London." Code: ABC. Telephone No.: Waterloo 3333 (60 lines).
Annual Subscription, Post free: Great Britain and elsewhere £2 9s. 6d. Cheques and Postal Orders (on Chief Office, London) to be made payable to ELECTRICAL REVIEW, and crossed "Lloyds Bank."
Entered as Second Class Matter at the New York, U.S.A., Post Office.

BUYING FOR EXPORT

Ericsson LM

SWEDISH ERICSSON Co. Ld.

329 HIGH HOLBORN, LONDON, W.C.I. Tel.: HOL. 1092

Acting as Buyers for—

TELEFONAKTIEBOLAGET L. M. ERICSSON, STOCKHOLM

AND THE FOLLOWING ASSOCIATED COMPANIES:

NORWAY Elektrisk Bureau • FINLAND O/Y L M Ericsson A/B DENMARK L M Ericsson A/S • HOLLAND Ericsson Telefoon-Maatschappij • FRANCE Société des Téléphones Ericsson ITALY Fatme • SPAIN Cía Española Ericsson S.A. • ARGENTINE Cía Sudamericana de Teléfonos L M Ericsson S.A. • BRAZIL Ericsson do Brasil Comercio e Indústria S.A. • COLOMBIA Cía Ericsson Ltda • CHILE Cía Ericsson de Chile S.A. • PERU Cía Ericsson S.A. • MEXICO Companía Comercial Ericsson S.A.

WE INVITE offers for all kinds of raw material for the Telephone and Electrical Manufacturing Trades as well as finished products in the same field for distribution in Scandinavia and Latin-America.

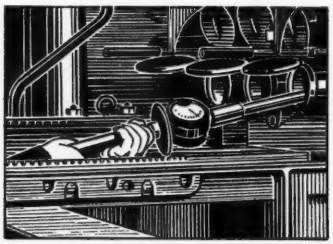
Sound and Safe

Electrical Accidents are far more easily prevented than cured. The consistent use of the two Everett Edgcumbe instruments described below will provide a perfectly sound and safe method of detecting the risk of trouble in its earliest stages.

1. SUPERSCALE LEAKAGE INDICATOR

SOUND insulation is essential on every electrical circuit. Any deterioration is immediately detected by the use of the Everett Edgcumbe Leakage Equipment, which gives a continuous indication (or record) of leakage currents. For all A.C. and D.C. Systems, with Warning Relays if required. Send for Sheet 340A. *Type H.S. Leakage Indicator for A.C. earthed system. Note extreme sensitivity on low leakage currents.*

2. LIVE CONDUCTOR TESTER



Live Conductor Tester in use on E.H.T. metal-clad switchgear.

IS IT SAFE? The Everett Edgcumbe Live Conductor Tester gives a positive indication of the potential of electrical conductors. Complying with E.R.A. Technical Report F/T 133, it includes a robust moving coil instrument with lower extended scale for easy reading. Several improvements based on experience have been embodied, and the Tester can also be used as a Voltage Indicator or as a phasing out device in conjunction with an auxiliary test rod.

MAKERS OF ELECTRICAL INSTRUMENTS FOR INDICATING, RECORDING AND CONTROLLING; PHOTOMETRIC APPARATUS; PROCESS CONTROLS.

EVERETT EDGCUMBE

DHB

COLINDALE WORKS, LONDON, N.W.9. TEL.: COLINDALE 6045

ELECTRICAL REVIEW

THE OLDEST ELECTRICAL PAPER

ESTABLISHED 1872

Vol. CXLIII. No. 3705
26th NOVEMBER, 1948

Congestion at the Fair

UNSATISFIED DEMANDS FOR SPACE

THOSE who remember the earlier days of the British Industries Fair will recall the reluctance of many electrical manufacturers to participate. They had good reason: Castle Bromwich, Birmingham, was not the most convenient place to get to; the arrangements were rather primitive; and the period of the Fair was considered too short to justify the transport, erection and removal of equipment, particularly of the heavier kinds.

There were farsighted men among them, however, who realized that Great Britain as an industrial exporting nation had to have a "shop window" into which overseas buyers could look and that electrical manufacturers could not absent themselves from such a display. Year by year a few of them proved that exhibits at the Fair brought returns, and gradually others followed their example. Another spur was the existence of a well-organized and arranged gas section (now no more) although this impressed home more than foreign buyers.

Pioneer Work

The *Electrical Review* helped to establish the Fair in 1915 and was largely instrumental in the formation of the original Electrical Section in 1926 in which the electrical exhibits were concentrated instead of being scattered about the Fair as they had been. The late T. R. Martin will be remembered as one who through this journal and by his contacts in the Midland area was most active in bringing this about; the other members of the original committee were Messrs. E. J. Jennings, F. J. Collis and D. N. Dunlop. Later many other prominent electrical men, including the late H. H. Berry, placed the Section on a permanent and imposing basis.

The work during a number of years of the Electrical Advisory Committee has borne abundant fruit and their post-war successors under the chairmanship of Mr. F. G. Nesbitt, with Mr. Raymond Berry as vice-chairman and Mr. A. H. Gambling as secretary, have actively maintained the standard. In point of fact, as in so many other electrical matters, this work has created a demand which has greatly outrun the supply, but a demand which somehow, and as soon as possible, has to be met.

Old and New Exhibitors

Space in the Electrical Section at Castle Bromwich which, until the outbreak of the war, had expanded year by year, is now so anxiously sought for that less than half the applicants can be satisfied. This has forced the Fair Management Committee to appeal to regular exhibitors to accept less space than they have had hitherto. As that space was seldom over generous they are naturally disinclined to accede to the request; a cramped unrepresentative display, they feel, is probably worse than no display at all. Some of them may think that it is unfair that they should be crowded up or crowded out by newcomers. Nevertheless it is necessary that these newcomers should be given a chance if the Fair is to be thoroughly representative of the industry.

It has been suggested that one partial remedy would be the removal from the section of a number of rather large exhibits which are in no way connected with overseas trade. Exhibitors consider that it is most undesirable that these stands should take up so much valuable space which export interests might occupy.

There is, however, only one real solution, that is the extension of the Castle Bromwich buildings. We are aware of the difficulties—shortage of steel and timber and the existence of all kinds of "priorities"—but this seems to be a special case involving a comparatively small allocation of material. If the Government really believes, as it seems to, that the British Industries Fair is one of the principal stimulants of export trade it should be able to secure the extension of the Castle Bromwich buildings.

IRON AND STEEL BILL

LAST week's three-day debate on the second reading of the Iron and Steel Bill resulted in the inevitable majority for the Government. In commending the Bill to the House Ministers based their arguments on apprehension of the future rather than present conditions; they had to admit that steel production was running at a record level. The Opposition speakers, led by Mr. Oliver Lyttelton, considered that the proposed upheaval in the industry was entirely unnecessary and would have no beneficial effect—rather the reverse. Particular objection was made to the acquisition of subsidiary companies engaged in a multiplicity of activities remote from the Bill's main purpose and to the terms proposed for the acquisition of the 107 companies named in a schedule to the Bill.

THERMOSTAT SETTINGS

SHORTAGE of power plant has emphasized the value of thermal-storage space heating in mitigating the need for load-shedding. At the same time fuel economy calls for accuracy in thermostat settings. Records kept in the Northmet Sub-Area of the Eastern Electricity Board show how great a difference even 5 deg may make during a heating season. That margin in excess of a specified 60 deg increases energy consumption by over 30 per cent and above 45 deg (as in a greenhouse) by nearly 80 per cent. For background heating 55 deg is generally regarded as satisfactory and if the temperature were lowered from 60 deg only 70 per cent of the kWh would be required.

UNIONS AND PRODUCTION

ONLY five out of 1,350 representatives of trade union executive councils at a conference last week voted against a resolution supporting the General Council of the T.U.C. in its call for maximum productive effort. In moving the resolution Mr. Jack Tanner (Amalgamated Engineering Union) said it was the unions' responsibility to grapple with the practical problems which faced their members in the workshop and they must recognize these problems as immediate ones. Shop stewards should be trained in the technique of management so that they could help to educate and inform the workers on productivity problems. Sir Edward Appleton told the conference of the scientists' contribution to increased production and contended that many problems and disputes could be settled by a greater use of scientific techniques and scientific tools.

ELECTRICAL EXPORTS

COMPARISON of the figures of electrical exports with those of all other classes entitles the electrical industry to pride itself upon its performance. The upward trend continued during October and a new record was made. The Board of Trade figures for the first ten months of the year show that exports of electrical goods and machinery were about 43 per cent higher than in the corresponding period of 1947. Exports of all other classes of "articles wholly or mainly manufactured" advanced by 37 per cent. Thus electrical shipments were well above the average.

ELECTRICITY CHARGES

AN indication of the necessity for raising the price of domestic electricity is given in the latest Ministry of Fuel and Power Statistical Digest. It is shown that while the average revenue per kWh sold for lighting, heating and cooking actually fell from 1·525d. in 1945-46 to 1·415d. in the following year, the receipts per kWh from electricity supplied for power purposes rose from 0·873d. to 0·884d. This was obviously the result of "pegging" domestic charges while coal clauses operated in power contracts.

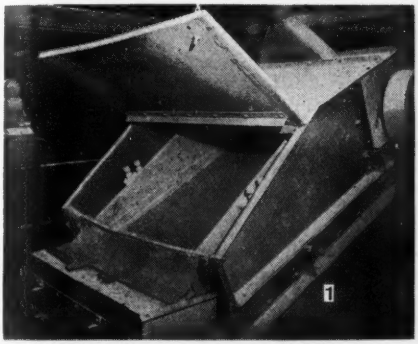
Fertilizer Granulation

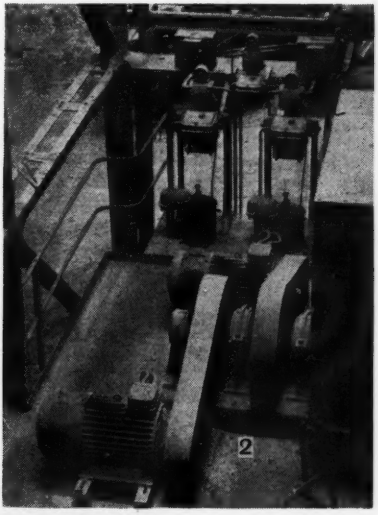
Modern Processes of Manufacture

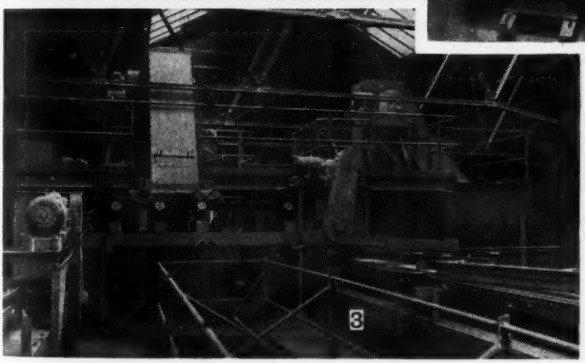
IN the *Electrical Review* of 13th August last, we described the electrical applications to the production of superphosphate which we saw carried out at the Ayr Chemical Works of Scottish Agricultural Industries, Ltd., and an outstanding feature of the installation was some particularly interesting and unusual group drives. We now propose to deal similarly with the plant at the same works which is devoted to the production of fertilizer by the modern process of granulation, in which a particular point of note is the large-scale use of the individual drive.

During the last ten years the processes of manufacture of artificial fertilizers in this country have been changing steadily, with the result that a large proportion of the fertilizer now used is in the granular form. This means that it consists of particles approximating in size from 1 to 3½ mm formed from the compounds of superphosphate, sulphate of ammonia, potash and other raw ingredients.

The main advantages found in producing fertilizers in the granulated form are the ease with which they will flow, the greater cleanliness afforded in handling, and the elimination of the tendency of the materials to set, as has often been the case with the powdered type.







(1) An eccentric flywheel vibrating screen rejects particles too large for the granulator

(2) Each disintegrator has an interesting dual drive; concentrical inner and outer shafts

(3) There are two parallel line conveyors over the proportioning bunkers, with reversible conveyor links at the ends; note elevator heads above

The processes of granulation at Ayr can be regarded as in three stages, namely, preparation of the raw materials, proportioning of the prepared materials, and granulation of the correctly blended mixture of the ingredients. These three sections of plant are all built up within a complex steel girder structure with the various components and suitable access galleries at different levels. The raw materials are prepared by two units, one of which handles the superphosphate and the other the salts. Each unit has an intake grid at ground level through which the ingredients are passed to fall on to an intake conveyor. This delivers them into a vertical bucket elevator which discharges them on to a preparation screen. At its head the elevator is driven by an English Electric 5-h.p., 960-r.p.m. squirrel-cage motor from which there is transmission through a right-angle " Radicon " reducing gear. The motor is served by an Ellison assembly with a direct-on oil circuit breaker and an isolating unit.

The preparation screen is a mechanically vibrating equipment of the eccentric flywheel type, and it rejects those particles which are too large for granulation. The screen is driven by a small motor at the back, with simple transmission to the eccentric at the top of the inclined screen. The rejected particles are chuted down to a Carr disintegrator which discharges them into the boot of the bucket elevator mentioned previously, for return to the vibrating screen.

Disintegrator Driving Method

Each disintegrator has an interesting dual-driving scheme. One of two 15-h.p., 970-r.p.m. motors drives an inner cage and the other an outer cage. In each case there is three-to-one V-belt transmission to the respective cage shaft. The inner cage shaft is contained within the hollow shaft of the outer cage, and the two cages are run in opposite directions. The Bruce Peebles slip-ring motors are served by Ellison oil circuit breaker and isolator equipments and drum-type starters.

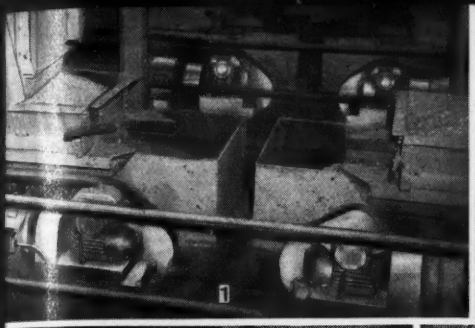
The material which passes through the screen is carried by a similarly driven elevator up to the bunker feed level where, by means of a system of conveyor belts and ploughs, the material is distributed throughout six proportioning bunkers as required. There are two parallel line conveyors, each disposed over three aligned proportioning bunkers which it serves. At each end of these line conveyors, however, is a reversible cross conveyor. Each cross conveyor is fed from its particular preparation unit and serves its conveyor line when running one way and the end bunker of the other line when in reverse. Thus it is possible for four of the bunkers to be served by each preparation plant as required. The driving schemes for the line and cross conveyors are very similar to those for the elevators, except that a reversing device is fitted to each of the reversing-belt motor starters.

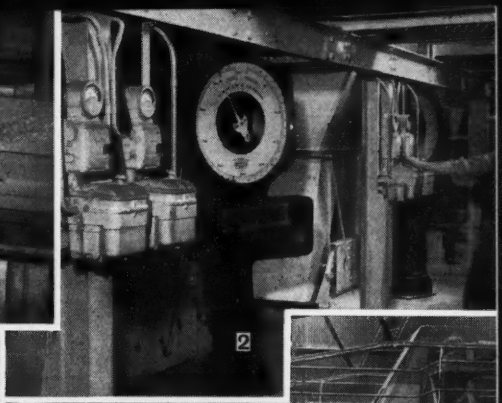
Mixing Ingredients

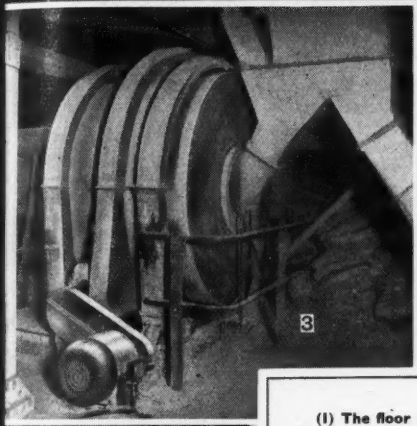
The next stage—proportioning and mixing the raw ingredients—is effected by three weighing machines, one under each pair of proportioning bunkers. The floor of each of the bunkers is a slowly moving belt conveyor the driving motor of which is controlled from the weighing-machine platform. Each of the floor conveyors is driven similarly to the elevators and conveyors mentioned, except that in this case there is a six-to-one reducing-ratio pinion transmission from the "Radicon" to the conveyor end drum. In order to weigh out a batch of the material the operative starts up the motor driving the conveyor forming the floor of the bunker containing the required raw ingredient, which thus produces a stream of the material into the hopper of the weighing machine.

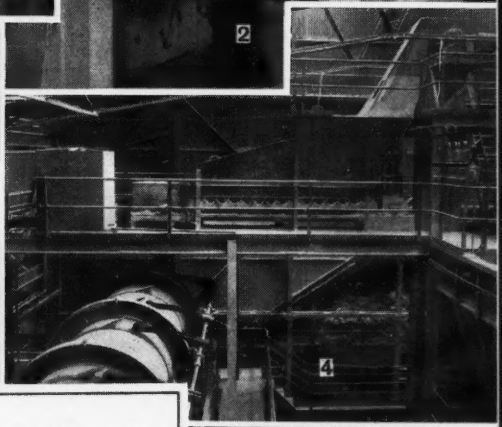
When the correct amount of material is indicated on the dial scale of the weighing machine the motor is stopped and the ingredient from the other bunker of the pair is then added. In this way the correct weights of the several raw ingredients are collected in the hoppers of the three weighing machines, each batch aggregating one ton. The one-ton batch is dropped from the weighing-machine hoppers on to a collector belt conveyor which is controlled by the mixing operative so as to deliver into either of two one-ton batch mixers located at ground level, alternately. The collector conveyor has a 5-h.p., 960-r.p.m. motor drive at the bottom centre of the conveyor, with transmission first through an enclosed reducing gear, then via a six-to-one reducing-ratio pinion gear on to a jockey-pulley arrangement.

Each of these batch mixers consists of a horizontal drum fitted with internal mixing and discharging vanes. Each mixer is served by a 10-h.p., 960-r.p.m. motor. There is first even-ratio belt transmission to an enclosed reducing gear from which a pinion system links up with a rack round the outside









(1) The floor of each proportioning hopper is a slowly driven conveyor ; four " floor " drives

(2) The motors driving the proportioning bunker floors are controlled from the weighing-machine platform

(3) Each batch mixer at ground level is a revolving horizontal drum with mixing and discharging vanes

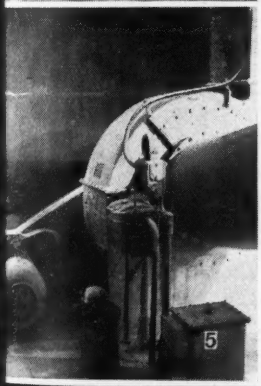
(4) The function of the smoothing hopper is to convert the process from batch to continuous operation ; note granulator below

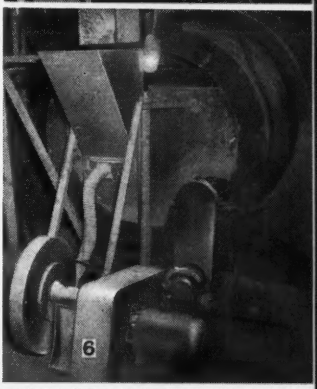
(5) A 65-h.p. motor-driven fan draws hot air through the dryer

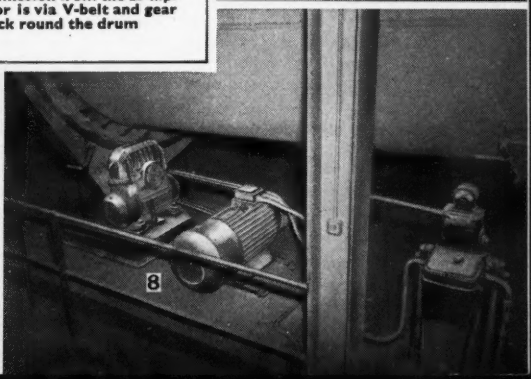
(6) The fan and the cleaning screw are the subject of a dual drive at the end of the granulator

(7) The collector conveyor drive is at the line centre and embraces a jockey-pulley scheme

(8) Transmission from the 25-h.p. dryer motor is via V-belt and gear box to a rack round the drum



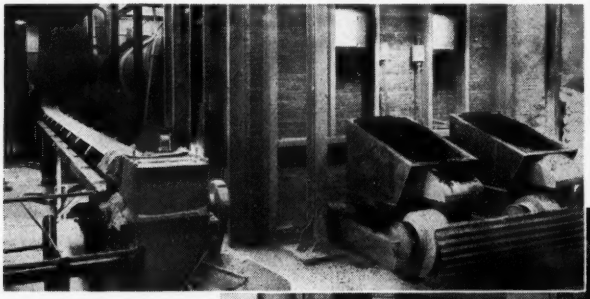


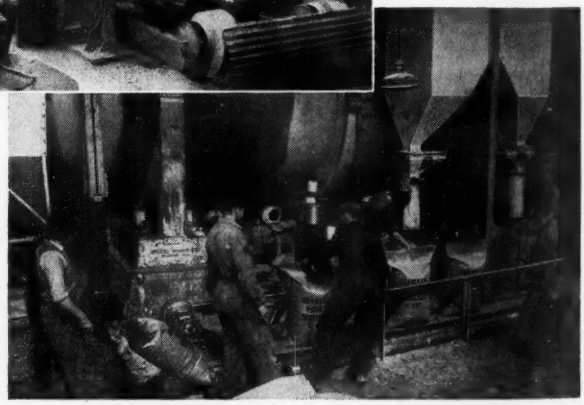


of the revolving shell of the mixer. Each batch is mixed for several minutes and is then discharged into a vertical bucket elevator which takes it again to the highest level for discharge into a smoothing hopper.

The function of the smoothing hoppers is to convert the process, which up to now has been a batch operation, into a continuous one, and this is accomplished by means of a continuously moving rubber conveyor which forms the floor of the smoothing hopper and is driven similarly to the elevators and conveyors before mentioned.

This floor conveyor carries the proportioned mixture at a constant feeding rate, which is controlled by a feed gate, down a chute into one of two granulators.





Above: Particles removed by the fines screens are chute fed on to a central collecting conveyor alongside the horizontal dryer

Right: Finally at one of the bagging stations the bags are filled, weighed and sewn up ready for delivery; cooler in rear

Each granulator is a revolving drum, slightly inclined from the horizontal, fitted with an internal cleaning screw and external cleaning hampers, as well as a system of sprays for moistening the incoming materials. It was a little surprising to see a 5-h.p. motor employed for revolving this huge drum, but the speed is only a few r.p.m. and the transmission is brought about first by V-belt to an enclosed gear box on the final shaft of which is a pinion which engages a rack round the drum. The material is blown into the granulator to ensure even moistening, and it is rolled round the rotating drum, forming in its passage through the granulator small moist particles within the required size range.

The fan is mounted at the end of the granulator and is driven by a small motor from which there is dual belt transmission, one to the fan shaft and the other to an enclosed reducing gear from which there is chain transmission to the internal horizontal cleaning screw shaft. The two granulators discharge into a common chute feeding a rotary dryer situated immediately below in which the granules are dried and hardened. The dryer is a shell about 60 ft long and 7 ft 6 in. in diameter, and fitted with internal baffles and lifting vanes to ensure maximum contact between the materials and a counter-current hot-air stream which passes through the dryer from a furnace at its end which is fired by two automatic motor-driven stokers.

The dryer is driven by a 25-h.p. slip-ring motor with 2-to-3 V-belt transmission to a "Radicon" gear on the final shaft of which is a pinion which engages a rack round the periphery of the dryer drum. The hot air is drawn through the dryer by means of a 65-h.p. slip-ring motor-driven " Sirocco " fan, with belt transmission and drum-starter control, and discharged into four cyclone separators which remove dust from the gas before the latter is washed and exhausted to atmosphere. The granules are discharged from the dryer on to an inclined conveyor which delivers them into

the boot of an elevator serving two oversize screens. These screens remove particles of over 3½ mm from the granules.

The particles pass under rectifier-supplied electro-magnets for the removal of any tramp iron which may be present, and they are allowed to fall into two cracker mills, each of which consists of two reels fitted with bars revolving against a central cracker bar, thus reducing the oversize material down to product size without creating an excessive quantity of dust. The cracked material is returned by conveyors and an elevator to the dryer intake for re-drying before it is once again screened.

The material which passes through the oversize screens is carried by a conveyor to a cooler which is similar to the dryer, although smaller in structure. In the cooler the granules are cascaded counter-current to a stream of cold air drawn through the cooler by a fan. The cold air, after passing through the cooler, is discharged into two cyclone separators and then into the gas-washing tower. The cooled material discharged from the cooler passes up an inclined bucket elevator and over two fines screens which remove the particles of under 1 mm in size. These pass down a chute on to a central dust collecting conveyor belt which also collects the dust discharged from the dryer and cooler cyclones. The product which passes over the fines screens is carried by conveyor belts to one or other of two bagging stations where the material is fed into the bags which are then weighed and sewn up ready for dispatch. Foot-switch control of the conveyor and the sewing machine is a feature of each bagging station.

Within reasonable limits there is a standardization scheme for the motors throughout the installation, so as to limit the number of spares it is necessary to carry. All the smaller motors, certainly those up to 5 h.p., and in some cases up to 10 h.p., depending on the starting torque, are squirrel-cage direct-on starting machines. Notable examples of the squirrel-cage motors with star-delta starters are those for the cooler drive, 15 h.p.; dust collector fan, 10 h.p.; and the cracker mills, 7·5 h.p. The outstanding slip-ring motors with drum-type rotor-resistance starters are those for the cooler fan, 30 h.p.; the dryer drive, 25 h.p.; the dryer fan, 65 h.p.; and the disintegrator, 15 h.p.

We are indebted to Scottish Agricultural Industries, Ltd., for permission to view the plant and to publish this article, and to Mr. W. L. Nicol, works manager, and Mr. A. W. Thomson, process superintendent, for facilities afforded to us.

Voltage Reference Tube

FOR some years there has been an increasing need for a compact and stable source of voltage reference for direct use in electronic circuits. This need is fully met in the voltage reference tube 85A1 recently introduced by Mullard Electronic Products, Ltd., Century House, Shaftesbury Avenue, London, W.C.2. Working in a self-regulated constant current circuit, this tube gives a voltage of such stability that it may, in the majority of applications, be used to replace a standard cell as a built-in source of voltage reference.

Mullard voltage reference tube

The ignition voltage of the tube is 125 V and the normal operating voltage 85 V. After an initial ageing period, the short term stability (100 hours maximum) is better than 0·1 per cent, while the stability over a period of 1,000 hours is better than 0·2 per cent. This high degree of stability is maintained even under intermittent switching conditions. Furthermore, a temperature coefficient of less than −3·5 mV per deg C eliminates the necessity of temperature compensation for most applications. It operates as a regulator over a current range of 1-8 mA, but for optimum performance as a source of voltage reference it is recommended that the tube be operated at 4·5 mA. Internally, the device resembles a normal neon gas discharge tube. It is of all-glass construction and is built up on a "loctal" type base which enables it to be firmly located in its socket.

French Import Duties

AMONG further classes of goods which became dutiable under the new French Customs tariff as from 17th October are generators, motors, transformers, convertors, batteries and accumulators, electrical appliances ("except electric wires and cables insulated by varnishes, lacquer, enamel, salts or metallic oxides") refrigerating plant and turbines.

Views on the News

By REFLECTOR

THERE is little doubt that makers of early electric cookers copied the old-fashioned cast iron gas cooker for the same reason that the first motor cars were made to resemble the horse-drawn brougham. The mid-period imitation by the gas-appliance manufacturers of domestic electric heating devices I regarded as an example of the sincerest form of flattery, but did not expect the next step to be taken by the oil industry. It seems that a bowl heater attachment is now being advertised for converting a portable paraffin pressure stove into a radiator "having a heat output of 3 kW (approximate) in two minutes," which acceptance of the electrical unit as a standard of performance is indeed a compliment.

◆ ◆ ◆

It is satisfactory to learn that the vindictive sentence imposed by the Jerusalem district court on Mr. F. W. Sylvester, an employee of the Jerusalem Electric and Public Service Corporation, has been quashed by the Israel Supreme Court. Mr. Sylvester was supposed to have engaged in espionage and illegal radio transmission. The "evidence" given at his trial was of a very flimsy character and the Supreme Court quite rightly held that it was no evidence at all.

◆ ◆ ◆

Very few British electricians are paid at the rate of about £2,240 a year. Nor, I imagine, are many American electrical craftsmen. Yet the *Electrical World* (New York) reports that an electrical utility anxious to complete a new station in time for the December peak has been forced to pay electricians $3 an hour for an eight-hour day, let them work a ninth hour for $6, and pay them $4·50 a day subsistence. This makes $34·40 a day or $172·50 per 45-hour week—not too bad.

◆ ◆ ◆

Something over a year ago there was a strike at one of the North of Scotland Hydro-Electric Board's sites because the tea provided was said to be unsatisfactory. Later another strike occurred when a man complained about the food and was told to leave. A fortnight ago there was another stoppage alleged to be due to the reprimanding of a canteen waitress because she gave a man a second plate of porridge because he did not want fish. Apparently it has not yet occurred to the Board to ensure satisfaction by engaging a London *maitre d'hôtel* to look after its catering arrangements.

◆ ◆ ◆

Sir Arnold Gridley is, I am glad to see, sufficiently recovered from his accident to resume his Parliamentary activities. He contributed to the second reading debate on the Iron and Steel Bill and said, according to *Hansard*:—

> "This is the first time this year that I have endeavoured to catch the eye of the Chair, because since I got knocked out at the beginning of the year I have lost a good deal of the confidence I previously may have possessed."

Nevertheless Sir Arnold proceeded to make some interesting and forceful comments upon the subject in hand, drawing particularly upon his experience on the North East Coast. He feared the effect of the measure on prices to steel users, especially the electrical manufacturing industries.

◆ ◆ ◆

An uncharted voyage of a well-known liner seems to be revealed in the report of an A.S.E.E. branch which in recording a conducted tour of the *Queen Mary* says:—

> "The visit included an inspection of the places normally barred to ordinary visitors. . . . Some idea of the size of the installation can be gained when it is realized that there are seven 1,300-kW generators in use.
>
> "We had a beautiful run through the New Forest, and it was altogether a most enjoyable day."

◆ ◆ ◆

It is notorious that electric power stations have had to take all kinds of coal during the past few years but those unacquainted with the special nomenclature of the coal industry may be surprised to learn from the *Glasgow Herald* that some electricity works in Ayrshire are designed for handling gum.

◆ ◆ ◆

Commencing with the next issue (3rd December) the price of the "Electrical Review" will be one shilling

Correspondence

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for the opinions expressed by correspondents.

Fine-Gauge Copper Wires

I SHOULD like to support Mr. Bennett in his plea for the return of the finer-gauge flexibles (*Electrical Review*, 12th November, p. 749). Quite apart from the viewpoint of accident prevention, there is the additional national aspect that there would be a considerable saving in time and the avoidance of scrap cable lengths owing to the premature fracture of the thicker conductors.

Fine-gauge copper wires seem to be in more plentiful supply now, and it would appear that there is no further reason for maintaining restriction on these superior (pre-war normal) flexible cables.

Slough. F. E. BUTCHER.

THE letter on this subject in your issue of 12th November prompts me to say that one of our employees had an electric shock which caused his death by falling off the scaffolding on which he was using a portable electric drill.

We and H.M. Factory Inspector were puzzled to know how this could happen until by the merest chance we found that the end of one of the fourteen strands of the c.t.s. lead had broken and worked its way through the rubber (near the cable entry into the drill) and must have touched the operator, who lost his footing and fell to his death.

CAUTIOUS.

Lift Safety

AFTER reading the interesting article by Mr. F. P. Phillips in your issue of 12th November it seems to me that if two ultimate limit switches are to be used an equally reliable and more convenient arrangement using quite standard equipment can be obtained. This arrangement, incidentally, would overcome the one minor objection which Mr. Phillips mentions, i.e., that when the limit switch is reset by hand after overtravel it would be possible to drive the lift further in the wrong direction.

My proposal is to employ two triple-pole limit switches capable of switching the main current, each switch being spring-biased to close its contacts which would, of course, be opened by direct mechanical action between a striker on the cage and/or counterweight and the switch arm on overtravel. The over-hoisting switch-limit contacts would be connected in series with the main raising contactor or controller contacts and the over-lowering limit switch contacts in series with the main lowering contactor or controller contacts. If it is deemed desirable that in case of overwinding an electrician should examine the mechanism, the limit switches could be of the type which remained open until reset by hand.

This arrangement seems to me to cover all the safety requirements and at the same time to be convenient since return to normal operation would be effected immediately.

London, S.W.3. W. S. FORSTER BROWN,
Magnetic Controls, Ltd.

WITH reference to Mr. S. T. Phillips' article, while we do not wish to raise any controversial points or argue the merits of the scheme described, we feel that we ought to point out that Mr. Phillips seems to have taken certain principles as tenable to-day but which were true some time ago only because of equipment limitations.

In stating that the lift will crash we must not overlook modern practice in providing speed governors and buffers and the universal adoption of traction drive. There is also provided a series of electrical safety circuits governing the stopping of the lift and protection of the motor.

We agree that the scheme he describes is an improvement upon the once-popular rope-driven over-travel switch, but we must point out that this is now obsolete in all high-class equipments. Now other methods are used which are equally applicable, and in fact are applied, to lifts of other classes.

Northampton. W. A. DIXIE,
Chief Engineer,
Express Lift Co., Ltd.

Electricity for Farmers

I WAS rather surprised to read "Reflector's" notes last week on the "irrational" desire of West Riding farmers who are asking the Government to supply electricity to their farms free of cost to them as I expected him to be conversant with the fact that many undertakings were doing this in their areas long before the vesting date. In all but the very remote areas a reasonable return on the capital cost of connection can be assured provided the capital expenditure is kept to a

minimum by careful planning and the use of standardized designs and material backed up by information and practical advice on how to make the best use of the supply.

The Government in a recent Act realized, however, that some financial assistance must be afforded in hill farming districts and provision is made now for grants to farmers up to 50 per cent of the total cost.

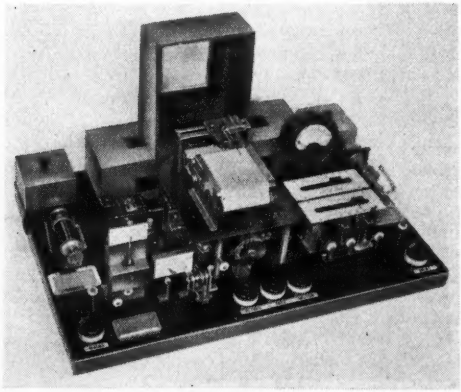
The resolution adopted by the West Riding farmers was a demand for electricity to be made available " as a vital means of reaching the food production target " and not to save labour costs as " Reflector " suggests. When electricity is taken to a farm the farmer does not discharge some of his staff but increases his production with the same number, a vital factor in the national economy at the present time.

W. A. H. PARKER, M.I.E.E.

London, W.C.2.

Wire Tester

WHEN using fine-gauge enamelled wire for deep windings or for coils with sharp corners, more trouble is caused by soft or brittle coverings than by pinholes. An instrument recently introduced by Evershed & Vignoles, Ltd., Acton Lane Works, London, W.4, tests the enamel covering for hardness and pliability as well as for pinholes, so that the best quality wire can be selected for use. In this way the number of rejects during manufacture can be reduced and production costs diminished.



Evershed wire tester

The bobbin of wire to be tested is fitted over the spindle of a tensioner, the wire being threaded over various guide pulleys to a second tensioner where it is re-wound. The tension, which can be varied, is shown on an indicator. The wire passes over a rotating steel knife which subjects the enamel to an abrasion test to reveal its hardness. The position of the knife is adjustable and the deflection produced in the wire can be set to within one-thousandth of an inch. The results of this test are recorded on the chart.

The wire then passes over a motor-driven measuring wheel, which governs both the length of wire tested and the speed at which it passes through the instrument, the latter being adjustable between 10 and 15 ft per min as required. The pliability of the enamel covering is next examined, the wire passing over a tiny wheel which deflects it through 90 deg. To reveal any breakdown of insulation caused by pinholes or by the preceding tests, the wire is passed through a mercury bath, the potential between bath and wire being adjustable between 10 and 100 V d.c. Leakage due to any insulation failure is automatically logged on the chart and by omitting one or other of the tests, it is a simple matter to determine the cause of faults.

The equipment also includes a protective circuit which may be arranged to stop the tester after a pre-set length of wire has passed.

Flameproof Headlamps

IN view of the increasing use of battery-operated or diesel-driven locomotives in coal mines, the General Electric Co., Ltd., Magnet House, Kingsway, London, W.C.2, has designed a flameproof headlamp which meets the requirements for Buxton certification (groups I and II). It is arranged for screwing on to a suitable bracket and for use with a 36-W automobile headlight bulb. The glass is of the tough armoured type which, if necessary, can be fitted with an internal diffusing screen, the beam of light normally being narrow to give the maximum throw of illumination. When it is desired to use the lamp as a red rear light, a suitable attachment is available. The company is also manufacturing a flameproof cab lamp which accommodates either a 15-W pigmy bulb or a 12-V omnibus bulb.

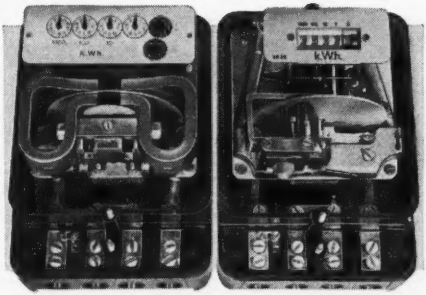
Small Industrial Motors

FRACTIONAL horse-power motors of the industrial type are now among the products of the Horkinson Electric Co., Ltd., Birchgrove, Cardiff. These motors are robustly constructed with cast bodies and end shields, and are available in four types, i.e., three-phase squirrel-cage, single-phase split-phase, single-phase capacitor and single-phase repulsion-induction (which are made in sizes up to 5 h.p.).

Meters and Clocks

INVESTIGATIONS FOR EXPORT RESULT IN IMPROVED HOME PRODUCTS

NOT only export customers but the home market too will benefit from investigations which British Electric Meters, Ltd., have been carrying out recently to meet the special requirements of overseas buyers. This work has applied in particular to domestic watt-hour type meters. Apart from ensuring that its instruments will operate under severe climatic conditions, the company has had to meet a demand for lightweight yet robust units and for roller indexes instead of the pointers more commonly used in this country.



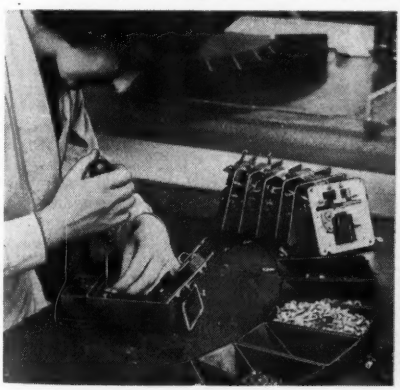
How the demands of overseas buyers are affecting meter design. Left: the "TM" meter for the home market. Right: Export model with anisotropic alloy magnets and polystyrene roller index

Of especial interest has been the development of the use of anisotropic magnets ("Alcomax II" and "Ticonal"). Measuring only $\frac{13}{16}$ in. × $\frac{13}{16}$ in. × $\frac{9}{16}$ in. (one magnet) compared with a pair of $1\frac{1}{2}$ in. × $2\frac{1}{4}$ in. × $\frac{7}{8}$ in. each of the normal type of magnet and weighing only 1·1 oz compared with 12·1 oz (two of 6·05 oz), these magnets appreciably reduce the weight of the complete meter. Extensive tests over three years have shown that apart from the exceptional efficiency of these magnets their permanence is greater than that of the heavier magnets previously generally used. The new type of magnets will no doubt eventually become a standard feature of all meters.

Further reduction in weight follows the development of a new type of roller index constructed of precision injection mouldings composed of polystyrene: it weighs only 1·5 oz against 3·75 oz. With all its rollers turning the friction produced in this index is substantially less than that of the standard pointer type. The incorporation of a direct-reading index is an essential requirement for meters intended for many overseas markets and with the necessity for strict watch on meters in this country owing to the need for economy in the use of electricity it is probable that their use will become more widespread here.

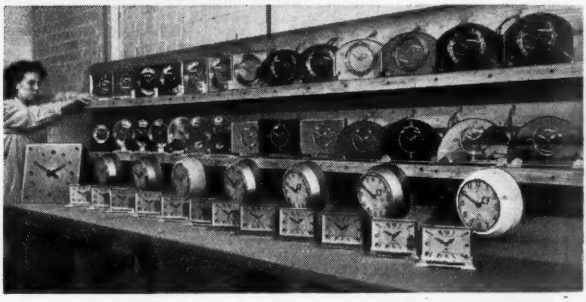
Further refinements in designs have resulted from the necessity for meeting especially exacting conditions encountered in some overseas countries. For tropical service, for instance, a non-hygroscopic insect-proof gasket cord is used to seal the joint between the meter cover and the base. Shunt coils are also specially treated for the same reason, while even more

Left: Assembling frameplates and elements to base. Right: Metal cases are still popular abroad. Here pillars are being riveted into the pressed steel base



attention than usual is paid to plating finishes, particularly of terminal screws.

These two latter refinements may result in various complications in manufacture. Certain protective materials used in vacuum impregnation may be detrimental to the wiring owing to electrolytic action. The special treatment of screws may also, besides preventing rust, have an insulating effect and affect the operating characteristics of the meters. Metal cases are



Above: Section of the main test room
Right: Electric clocks on test

still much in favour abroad though there is a stronger tendency to adopt the bakelite type.

Few alterations in the design of "Silentime" electric clocks (a post-war development) are necessary to meet export demands. The eight main types of mantel, desk and wall clocks in glass, wood and plastic have a wide appeal, the glass models in particular being of most striking modern design. Contrary to the more usual practice nowadays the high torque motors incorporated are self-starting, their ability to cope with quick fluctuations in supply and temporary voltage drop being considered a distinct advantage.

Two years ago the company's production was transferred from its wartime home at Darwen to a 70,000 sq ft Government-sponsored factory at Bangor in North Wales, the company's old works at Mitcham being retained solely as a test department. The new factory is laid out on the most up-to-date lines employing a conveyor system for assembly. Several of the principal components are built up in a sub-assembly section. The registers for instance are constructed from the main plates, register wheels, ratio wheels, dial plates and pointers. Similarly the series coils are wound and impregnated, the leads are cleaned, the coil formers are added and finally the coils are fitted on to the series cores. Before assembly all the bottom jewels are cleaned and microscopically examined for cracks, dust, etc.

On the main assembly conveyor line, at the first station, the shunt and series coils are assembled to the frame plate, screws being assembled loosely. At the second station the screws are tightened up by the aid of an air-operated screwdriver, care being taken to ensure that the gap between the series and shunt coil is held to a definite dimension and within a tolerance of 0·001 in.

Later the temperature compensation and quadrature adjustment devices are added. The meter element is then fixed to the meter base and secured with screws. The low load adjustment is inserted and the frame, bottom jewel and top pivot are added. Assembly of the rotor disc and magnets follow, care being taken to ensure that these components are free from dust and other foreign bodies. Finally, the register is secured and set in position and the meter cover assembled and secured to the meter base.

After a general inspection of the meter there is a flash test at 2,000 V followed by stroboscopic tests at both full and low load and later the normal testing against rotating sub-standards.

Extensive business is in hand for Argentina, Turkey, Portugal, India and Greece. The company is represented all over the world and has arranged, or is completing negotiations for, agencies in many countries.

Tinplate Workers' Scholarships

The Court of the Worshipful Company of Tinplate Workers has decided to offer twelve travelling scholarships for next year. The conditions will be exactly the same as those aid down this year.

Electricity Statistics

MINISTRY OF FUEL DIGEST : GENERATION FIGURES FOR OCTOBER

THE Ministry of Fuel and Power Statistical Digest for 1946 and 1947 is now available (Cmd. 7548, H.M. Stationery Office, 3s.). It is a volume of 170 pages containing 123 tables relating mainly to the coal, electricity, gas and oil industries. Electricity is treated in eight tables setting out for the years 1938 to 1947 the number of undertakings, persons employed, electricity generated, fuel used, power plant capacity, load factor, an analysis of sales and revenue, capital expenditure and working expenses, surpluses and their appropriation. It is shown that in 1946 the number of people employed by authorized undertakings (including the Central Electricity Board) was 123,318; figures for 1947 are not yet available. Of the 43,984 million kWh generated in 1947 (against 42,742 million in 1946), 42,733 million was produced by steam stations and 1,128 million by water power. Coal consumption was 27·0 million tons (against 26·2 million tons in 1946).

Plant capacity (m.c.r.) in 1947 was 12,695,000 kW (12,498,000 kW in 1946); the aggregate of individual maximum loads on power stations was 11,460,000 kW (11,234,000 kW); and the load factor 42·4 per cent (41·9 per cent).

Estimated figures of sales, in millions of kWh, for 1947 (subject to revision) were as follows:—Domestic and farm premises, 12,724 (11,425 in 1946); shops, offices and other commercial premises, 3,842 (3,894); factories and other industrial premises, 17,674 (17,714); public lighting, 179 (254); traction, 1,362 (1,372); total 35,781 (34,659).

Total revenue in 1946-47 from the sale of 35,059 million kWh (31,684 million in 1945-46) was £163·7 million (£148·9 million) of which £91·5 million (£78·4 million) was from lighting, heating and cooking; £66·1 million (£65·1 million) from power; £0·23 million (£0·20 million) from public lighting; and £1·4 million (£1·2 million) from traction. The corresponding revenue per kWh sold was as follows:—Lighting, heating and cooking, 1·415d. (1·525d.); power, 0·884d. (0·873d.); public lighting, 1·361d. (1·319d.); traction, 0·847d. (0·841d.); total 1·121d. (1·128d.).

It is shown that the total working expenditure rose from £94·8 million in 1945-46 to £103 million in 1946-47. Under the heading "generation," fuel costs increased from £46·4 million to £51·1 million and salaries and wages from £4·0 to £4·2 million. The cost of coal and coke per ton, including handling, went up from 39s. 5d. to 44s. 3d. (It was 20s. 4d. in 1938-39.) Capital expenditure at the end of 1945-46 stood at £794·6 million; at the end of 1944-45 the figure was £775·4 million.

Among the tables covering the coal mining industry is one showing that the number of electric motors in use in mines and above ground at 30th June, 1947, was 77,000, of a total h.p. of 2,736,600, compared with 72,800 (2,632,000 h.p.) at 30th June, 1946. The proportion of these supplied from colliery generating stations was 29·9 per cent in 1946-47 and 31·7 in 1945-46.

Latest Generation Figures

We reproduce a table prepared by the Ministry of Fuel and Power showing the electricity generated and sent out, fuel consumed and installed plant capacity for the month of October and the completed portion of this year.

The weekly statistics issued by the Ministry show that the output from solid-fuel fired stations in the week ended 12th November was 934·6 million kWh, against 891·6 million kWh in the preceding week and 815·2 million for the week ended 14th November, 1947. Stocks of coal at electricity undertakings at 13th November amounted to 4,443,200 tons.

	Fuel consumed* Thousand tons		kWh generated millions			kWh sent out millions	Installed capacity (m.c.r.) MW
	Coal	Oil	Steam	Water power	Total†		
British Electricity Authority	2,368	3·6	3,848	46	3,909	3,684	12,825
North of Scotland	18	0·7	25	82	110	109	325
Total for October, 1948	2,386	4·3	3,873	128	4,019	3,793	13,150
Total for October, 1947	2,241	3·5	3,637	79	3,729	3,516	12,529
Per cent increase on 1947	6·5	22·9	6·5	62·0	7·8	7·9	5·0
Total January-October	22,521	32·0	36,247	1,081	37,461	35,330	
Corresponding period of 1947	20,868	43·8	33,155	913	34,194	32,231	
Per cent increase or decrease on 1947 ..	+7·9	−26·9	+9·3	+18·4	+9·6	+9·6	

* Including North of Scotland Hydro-Electric Board and Lochaber Power Co.
† Including generation by other means amounting to 18·4 million kWh in October, 1948.

PERSONAL and SOCIAL

News of Men and Women of the Industry

THE Northern Ireland Minister of Commerce (Sir Roland Nugent) has recommended the following for the reconstituted **Northern Ireland Electricity Board**:—Sir William Robinson, J.P., chairman; Major C. A. M. Alexander, M.C., D.L., J.P.; Mr. A. G. Algeo, J.P.; Mr. W. A. Mullen, D.L.; Mr. A. Shiells; and Mr. James Walker, F.C.A. The Electricity (Supply) Act passed last summer provides for an expansion of the personnel of the Electricity Board in recognition of the wider duties for which the Board will be responsible under the Act. Belfast Corporation Electricity Committee, specially called for the purpose, approved of the city electrical engineer, Mr. W. J. Girvan, acting as a member of the new Northern Ireland Joint Electricity Committee.

Sir John Dalton, A.M.I.E.E., F.C.I.S., has been elected president of the Electrical Trades Commercial Travellers' Association for the coming year. Sir John, who is Director of the Cable Makers' Association, was until vesting date a director and joint general manager of the County of London Electric Supply Co., and a director of associated and other companies. Upon the nationalization of the electricity supply industry he became a member of the South-Eastern Electricity Board. During the war he was chairman of the Public Utilities Coal Committee and Controller of Fuel and Power for London and South-East England. The chairman of the Association is Mr. W. Herbert, manager of Underwood (Electric), Ltd. The Association is holding a dinner and smoking concert at Fleming's Restaurant, 307, Oxford Street, London, W.1, on 3rd December. Tickets (12s. 6d. each) can be obtained from Mr. C. L. Elvy, 26, Greencroft Road, Hounslow, Middx.

Sir John Dalton

Sir Arthur Fleming, C.B.E., D.ENG., director of research and education to the Metropolitan-Vickers Electrical Co., Ltd., has been elected president of Section G. (Engineering) of the British Association for the Advancement of Science for 1949. Sir Arthur was president of the Education Section in 1939.

Mr. H. W. Millatt has recently been appointed commercial officer to the Cornwall Sub-Area of the South Western Electricity Board. Mr. Millatt was previously for nine years district manager of the North Central Cornwall District of the Cornwall Electric Power Co., and at a recent gathering of 160 employees of the District at Newquay he was presented with an inscribed gold wristlet watch and autograph book.

Mr. G. M. Wright, B.ENG., M.I.E.E., engineer-in-chief of Marconi's Wireless Telegraph Co., Ltd., has been appointed a member of the Radio Research Board of the Department of Scientific and Industrial Research. Before the war Mr. Wright was head of the Marconi Research Department, where his work gained for him an international reputation. At the outbreak of war he joined the Admiralty and became chief scientist at the Admiralty Signal Establishment, a position which he held until he returned to the Marconi Co., as engineer-in-chief in October, 1946.

Mr. G. M. Wright

Mr. F. Wade-Cooper has been appointed to represent the Institution of Electrical Engineers in India and Pakistan, and **Mr. D. P. Bennett** as representative in Ceylon.

Mr. L. G. Price, Simplex Electric Co., Ltd., has been appointed commercial officer with the South East Scotland Electricity Board, Edinburgh Sub-Area. Before joining the Simplex Electric Co., he was showroom manager and subsequently deputy consumers' engineer with the St. Helens Corporation, Electricity Department. During the war he served with R.E.M.E. in the Far East with the rank of captain. Mr. Price takes up his new duties on 1st December.

Mr. M. H. Beattie, A.M.I.E.E., who has recently been appointed London sales manager of Scottish Cables, Ltd., obtained his education in electrical engineering at the Royal Technical College, Glasgow, and served his apprenticeship with the British Broadcasting Corporation and the General Electric Co., Ltd. He joined the Scottish Cables staff at Renfrew early in 1946.

Mr. M. H. Beattie

West Hartlepool Corporation has agreed to raise the salary of the transport manager, **Mr. A. Burton**, to £900 per annum.

Mr. A. P. MacKim, A.M.I.E.E., planning and development engineer for the Glasgow Sub-Area,

has been appointed technical engineer on the headquarters staff of the chief engineer, South-West Scotland Electricity Board. Mr. MacKim was formerly with the Clyde Valley Electrical Power Co., and Glasgow Corporation Electricity Department. He is at present a member of Committee of the Scottish Centre of the I.E.E.

Mr. J. S. Heiton has been appointed purchasing officer at the South West Scotland Electricity Board's headquarters. He held a similar position with the Clyde Valley Electrical Power Co.

Mr. J. Farmery, B.SC.(ENG.), A.M.I.MECH.E., A.M.I.E.E., acting principal of Walsall Technical College, has been appointed principal of Cumberland Technical College.

On Wednesday last week the president of the **Electrical Association for Women,** the Dowager Lady Swaythling, who herself was hon. treasurer from 1931 to 1938, presented special badges to past chairmen and past treasurers. Unfortunately the first two chairmen, Mrs. Ferranti Kirkwood and Alderman Mrs. Gregory, were unable to be present. Three past chairmen, therefore, Mrs. H. Bentham, Mrs. M. B. Jackson and Mrs. F. N. Rendell Baker, and three hon. treasurers, Mrs. I. E. Bray, Mrs. W. Scott and Miss F. E. Jones, received their badges from Lady Swaythling, who was presented with her own badge by the present E.A.W. chairman, Mrs. A. B. Lewis.

At the Council meeting held at 35, Grosvenor Place on 17th November, Sir Henry Self, deputy chairman of the British Electricity Authority, was welcomed as representing the

Mrs. M. B. Jackson, Mrs. W. Scott, Miss F. E. Jones, Lady Swaythling, Mrs. Rendell Baker, Mrs. H. Bentham and Mrs. I. E. Bray, who received special badges last week for services as past chairmen and past treasurers of the Electrical Association for Women

B.E.A. Mrs. R. Messenger, J.P., adviser on women's work to the Eastern Electricity Board, was also present as a new member of the Council.

Mr. G. W. Tookey, A.C.G.I., has been elected chairman of the Junior Institution of Engineers for the ensuing year. The vice-chairmen are Messrs. **S. J. Crispin,** L.R.I.B.A., M.I.STRUCT.E., and **P. B. Hebbert,** ASSOC.I.MECH.E.

Mr. H. Annis has been appointed to succeed the late Mr. A. J. Simpson as chief inspector of the Metropolitan-Vickers Electrical Co., Ltd.

Mr. H. Annis

Mr. Annis joined the Mechanical (then Engine) Department of the company in 1912, taking charge of inspection in that department in 1917. After two years in Russia on behalf of the Metropolitan-Vickers Export Co., he returned to the Trafford Park Works in 1932, and in 1934 he was appointed chief mechanical inspector. He became assistant chief inspector in 1944. Mr. Annis is chairman of the company's Long Service Association, and is also a past president of the Manchester Engineering Council.

Professor R. O. Kapp has been re-elected Dean of the Faculty of Engineering of London University for 1948-50.

Mr. A. D. Church, M.I.E.E., A.M.I.I.A., is resigning from the position of engineer to the Fens Sub-area, Eastern Electricity Board, to take up the post of assistant manager in charge of operations with the Jamaica Public Service Co., B.W.I. He expects to sail early in the New Year. Before the nationalization of the supply industry Mr. Church was with the Beds, Cambs and Hunts Electricity Co.

Mr. W. O. Jackson, Associate I.E.E., whose appointment as technical representative for London and the Southern Counties to G. P. Dennis, Ltd., was reported in our last issue, was for ten years sales engineer in the London organization of Dorman & Smith, Ltd.

The combined Athletic and Social Clubs of the **General Electric Co., Ltd.,** Wembley, in co-operation with the Central Council of Physical Recreation, presented "Sportlight" at Hirst Hall, Wembley, on 12th November. The programme consisted of a series of demonstrations by outstanding sporting personalities, and the second half of the show was televised.

Mr. H. W. Bosworth, chairman and managing director of Lancashire Dynamo & Crypto, Ltd., is sailing this week (25th November) to South Africa on the *Athlone Castle.* He will visit the company's offices and agencies throughout the

Union and the Rhodesias, using as his headquarters the offices of Lancashire Dynamo & Crypto South Africa, Pty., Ltd., at Johannesburg. Mr. Bosworth expects to return from Durban towards the end of February next year.

In 1898 the **Brighton Electricity Cricket Club** came into being under the presidency of the late Mr. Arthur Wright, and the Club's jubilee was celebrated by a dinner at Brighton on 13th November. Mr. G. Cooper, chairman of the Brighton, Hove and Worthing Gas Company C.C., proposed "The Club" and Mr. G. Leaper (Brighton captain) responded "Our Guests" was proposed by the president, Mr. H. Pryce-Jones, and Mr. N. Boydell replied. The company, which numbered nearly sixty, also included Mr. S. Tyler, one of the few surviving members of the 1898 season, Alderman E. Simms and Messrs. W. N. C. Clinch, C.C. Hill, T. Yule, F. Lynn, S. L. Robinson, H. Jones (chairman of the Club) and C. W. Bennett (secretary).

Obituary

Mrs. H. H. Berry.—The death occurred on 15th November, after a long illness, of Mrs. Alice Edith Berry, widow of Mr. H. H. Berry, chairman of Berry's Electric, Ltd. Her younger son, Mr. Raymond Berry, is now chairman of the company; her elder son, Mr. G. J. G. ("Tim") Berry, lost his life in an air raid during the war.

Mr. L. S. Davis.—Mr. Leonard Shaw Davis, whose death occurred on 11th November at the age of fifty-six, was a personal assistant to the managing director of Babcock & Wilcox, Ltd., and a director of Edwin Danks & Co. (Oldbury), Ltd., and Penman & Co., Ltd. He was president of the Mechanical Handling Engineers' Association, chairman of the Tank and Industrial Plant Association, and a Council member of the British Engineers' Association. Many of his colleagues were present at the funeral service at St. Dunstan's Church, Cheam, on 15th November.

Mr. R. S. Savory, assistant engineer at Tynemouth under the British Electricity Authority, has died at the age of sixty-two. He joined the former Tynemouth Corporation Electricity Department in 1912.

Dr. Birger Ljungström, whose death is reported, was a prominent Swedish engineer, one of two brothers who invented the Ljungström turbine, made in this country by the Brush Electrical Engineering Co.

WILLS—Mr. G. A. J. Lee, secretary of the Sun Electrical Co., Ltd., who died on 21st May, left £9,971 gross (£6,976 net).

Mr. E. Hopps, former senior charge engineer at North Wilford power station, Nottingham, who died on 3rd July, left £5,546 gross (5,438 net).

Mr. A. T. Halstead. of Mullard Electronic Products, Ltd., left £3,045 gross (£2,786 net).

Housecraft Course

DAME Caroline Haslett, D.B.E., Director of the Electrical Association for Women, welcomed the sixty delegates to the two-day Course in Electrical Housecraft for Teachers at the E.A.W. Headquarters on 15th November and introduced Mr. H. J. Randall, chairman of the London Electricity Board. In his opening address Mr. Randall said that some time ago the electrical industry had become concerned that while the domestic science training colleges were turning out excellently trained students, these students knew comparatively little of electricity because they had received their training mainly on gas and solid-fuel consuming apparatus. The Electrical Development Association decided to remedy this deficiency in the training colleges and after consultation with the principals they examined the equipment in the colleges and supplied the bulk of the required apparatus. In future students would receive a very sound knowledge of the use of electricity and electrical appliances. The Electricity Boards, as well as the E.A.W. were anxious to give every possible assistance to teachers.

I.E.E. Scholarships

SCHOLARSHIPS for 1948 have been awarded by the Institution of Electrical Engineers as follows:—

Research Scholarships:—*Ferranti.*—A. A. Robinson (Manchester University); *Oliver Lodge.*—N. Elson (Cambridge University); *Swan Memorial.*—T. W. Berrie (Durham University); *C. P. Sparks War Thanksgiving Fund.*—A. J. Blare (Queen Mary College, London) and A. E. Kay (Durham University).

Student Scholarships:—*Duddell.*—J. P. C. Allen (Christ's Hospital); *Salomons.*—G. F. Barker (University College, London); *David Hughes.*—K. E. Wood (University College of South Wales); *Paul.*—M. A. Wagstaff (Roan School, Greenwich); *Thorowgood.*—G. W. Bentall (British Railways, Eastern Region) and R. D. Razzell (British Railways, Southern Region).

Christmas Lectures

THE I.E.E. Council has arranged for two children's lectures to be given by Dr. P. Dunsheath, C.B.E., in the Institution's Lecture Theatre on 29th and 30th December. The first will be "The Birth of a Giant"—a simple explanation, with demonstrations, of the principles involved in the generation of electricity, including the steam plant side. The title of the second lecture is "Leading the Giant to Work"; it will deal with the control, distribution and application of electricity.

Schools in the Home Counties are being invited to apply for tickets but a number will be reserved for members' children and should be applied for to the Secretary by 3rd December.

Industry and the House

Radio Interference Suppression

By F. J. ERROLL, M.A., A.M.I.E.E., M.P.

MANY people found the Conservative opposition to the Wireless Telegraphy Bill hard to understand. That a measure which seemed desirable to forward-looking electrical engineers and radio manufacturers should be opposed by the party claiming to represent free enterprise has been taken to indicate a high degree of short-sightedness and reaction in that Party. Now that the committee stage of the Bill has been taken as well as the second reading it is possible to see the matter more clearly.

The Bill, while excellent from a technical point of view, is politically a thoroughly bad Bill. The Conservative Party felt that it must take a stand against a measure which showed such a light-hearted attitude towards members of the public who would be adversely affected by it. The Bill aroused sufficient consternation amongst Labour back-benchers for Mr. Herbert Morrison, Leader of the House, to say that it should be possible to look at it with a view to making improvements. In fact upon the second reading, which was fully reported in last week's issue of the *Electrical Review*, the Government gave no hint of any improvement to the Bill. For this reason alone the Opposition was fully entitled to vote against a Bill for which there was no desperate hurry, and should have been withdrawn for re-writing before subsequent re-submission to the House.

Types of Interference

The Opposition's objections to the Bill were in fact partly met during the committee stage, which serves to demonstrate the importance of having made a strong protest at the time of the second reading. A particular objection was that apparatus, industrial or domestic, lawfully acquired could now be the subject of an offence, and the owner compelled to modify it at his own expense. Bills having a retrospective effect are always unpopular, and one like this might affect the private individual most of all. The Government's justification was that interference from even domestic apparatus might interfere with radio communication with landing aircraft, and thus be a source of danger to life. Conservatives objected that this contention—at no time proved—was to be used as an excuse for the exercise of powers against the owner of any apparatus which was only interfering with the reception of ordinary broadcasting programmes. In the committee stage the Government promised to see if a form of words could be found to ensure that notices would only be served on persons actually causing interference, and that these persons would in any case have the right of appeal to a tribunal.

Reduction of Penalties

The appeal suggestion was also objected to since it was felt that the tribunal would be heavily weighted in favour of the Postmaster-General; it would surely be better for the matter to go to the Courts in the ordinary way. The penalties which the Courts could inflict included imprisonment up to three months in the case of a person who deliberately used apparatus causing interference. This was an altogether too savage penalty, particularly as a person who operates an unlawful transmitter can only be fined £10—and what is a piece of unsuppressed apparatus but a transmitter of wireless signals? The Government reduced the penalties during the committee stage, and eliminated imprisonment.

The Postmaster-General is to be assisted in his work by an advisory committee which is to consist of persons named by the President of the I.E.E. The Opposition felt that this committee should include representatives of domestic and industrial users. Mr. Hobson, the Assistant Postmaster-General, declined to widen the committee. He said that his Department only required technical advice and would go to Parliament for users' suggestions !

Instruction for Members

Parliament does not seem the most appropriate body to make these suggestions, especially as Departmental decisions will have already been taken before the Orders under this Bill are laid before the House. Nevertheless, M.P.'s of all parties are in a better position to understand the problems involved in the suppression of domestic apparatus as the result of a special exhibition

organized at short notice by a firm of radio manufacturers which wishes to remain anonymous.

The Opposition did not like the proposal that the Postmaster-General should have powers of entry to examine domestic apparatus believed to be causing interference. The technicians have said that no other method of locating the apparatus would be fully satisfactory, but it is questionable whether further powers should be given.

One interesting point emerged in the discussion on Part 1 of the Bill. In future any change in the price of a wireless receiving licence will be made by a regulation which must be laid before Parliament. This will provide the House with an opportunity of debating the change if it so desires instead of trying to pursue the matter by question and answer as it tried to do rather unsatisfactorily on the occasion of the last increase.

Bankside and St. Paul's

Mr. Keeling and Mr. Skeffington-Lodge, the two members who have taken such a close interest in the new Bankside power station are far from satisfied that the provisions for safeguarding St. Paul's Cathedral are being adhered to. Mr. Keeling contends that the Government promised that no work would be started on the site until sulphur fume extraction plant had been tested and proved successful. The Minister, referring to Battersea power station, said that there was no doubt about the practicability of eliminating the fumes, and that it was only a question of the best way of doing it. Mr. Keeling will be heard again on this matter.

PARLIAMENTARY NEWS

By Our Special Reporter

ANSWERING questions during the Committee stage of the Wireless Telegraphy Bill in the House of Commons, Mr. Hobson, Assistant Postmaster General, said that at present wireless receiving licence fees were arbitrarily decided, without reference to Parliament. Under a new provision in the Bill it would not be competent for the Postmaster-General to increase or reduce the charge for a licence without reference to Parliament. He had to lay a regulation before either House and members would have an opportunity of stating their views.

On Clause 3 (Regulations as to wireless telegraphy) Mr. Erroll asked to what extent the Postmaster-General would make use of his powers to ensure that wireless masts caused the least interference with the natural amenities of a district.

Mr. Paling said that the Post Office had to have regard to the amenities of a place when they erected these masts. He instanced the recent case of White Horse Hill.

On Clause 9 (Advisory committee and appeal tribunal) Mr. Erroll said that, as a member of the Institution of Electrical Engineers he welcomed the inclusion of that body on work of this character. But he was sure that they only expected to be called on to advise on the technical aspect of the Bill and its consequences. They would shrink from attempting to nominate to the panel from which the Advisory Committee would be formed representatives of non-technical users such as housewives, although they might be able to make useful suggestions in regard to other categories, such as industrialists and shipping people.

Mr. Hobson said that because it was a technical committee the Government felt that it was absolutely essential that it should be composed solely of experts. They were not concerned about the design of the particular domestic apparatus, but about the emission of electromagnetic energy.

On Clause 10 (Regulations as to radiation of electromagnetic energy, etc.) Mr. Grimston moved an amendment to regulate manufacture "to ensure that no undue interference was caused by the use of the manufactured article." He said that the Postmaster-General was going to tell users of flat irons, electric cleaners, etc., that they would not be allowed to use the apparatus unless they fitted suppressors but he was not going to take any powers to force manufacturers to incorporate suppressors. In many cases, all that was needed could be done at one-fifth of the cost during manufacture.

Mr. Paling replied that the amendment would not have the effect desired. He promised, before the report stage, to see if a way could be found of dealing with the matter during the manufacturing stage. The amendment was withdrawn.

On Clause 11 (Enforcement of regulations), Mr. Manningham-Buller moved an amendment to restrict the Postmaster-General's powers to prohibit radio interference endangering human safety. At present the clause enabled him to forbid the use of any apparatus, whether machinery or domestic appliances, interfering with the reception of broadcasting or television. Though something had to be done the proposed powers were too drastic.

Sir H. Shawcross said the only persons who need feel troubled about this were the selfish persons who knowingly continued to use apparatus which was causing interference. In the absence of such powers there would be no

way in which this form of nuisance could be dealt with.

Air Commodore Harvey urged that the Bill should pass into law without delay in order that aircraft could be safe from the effect of householders' apparatus on the marker beacons used in the blind approach system. He suggested that there should be a discussion with the apparatus manufacturers.

Sir H. Shawcross promised to consider a form of words to ensure that save in cases where safety of life or vital communications services were involved notices would only be served where apparatus was actually causing interference. The amendment was negatived.

On Clause 13 (Penalties and legal proceedings) Mr. Paling moved the introduction of a new sub-section reducing the penalty in the case of a second offence from £100 to £50 and excluding imprisonment, the penalty for a first offence remaining at £10, in the case of infringements which did not endanger the safety of life. The amendment was agreed to.

Electricity Charges

Sir John Mellor asked under what statutory powers he had authorized the London Electricity Board to raise charges to domestic consumers and cancel existing contracts, without the consent of the other parties.

Mr. Robens, Parliamentary Secretary to the Ministry of Fuel and Power, said that the Electricity Boards required no authorisation from the Minister to alter their charges to domestic consumers.

Bankside Power Station

The Minister of Fuel and Power (Mr. Gaitskell) told Mr. Erroll that it was still his intention that Bankside power station should be oil fired. He did not accept Mr. Erroll's implication that the use of fuel oil for this purpose in 1951 placed any restriction on petrol for motorists at the moment.

Answering Mr. Skeffington-Lodge, Mr. Gaitskell said that the Government's technical advisers were satisfied that harmful sulphur fumes could be effectively eliminated. The tests on the pilot plant were solely for the purpose of selecting the most efficient method of gas washing. In view of the increasingly urgent need for new generating capacity in London it was only sensible, therefore, to proceed as quickly as possible with the erection of those parts of the station that would not be affected by the type of gas washing plant it was decided finally to install.

Mr. Keeling asked if the Minister would promise, in accordance with a previous pledge given to the House, that if no way was found of making the fumes harmless to St. Paul's, the project would be abandoned.

Mr. Gaitskell replied that the Minister of Town and Country Planning had made it perfectly clear that there was no doubt about the practicability of eliminating the fumes. It was a question of the best way of doing it.

Asked by Mr. Bossom if he could give the name of any plant of this size where the system had been effective, Mr. Gaitskell said he understood that Battersea had a plant of this kind.

Mr. Keeling said that as the Minister's statement was a flagrant breach of the Government's promise, he would raise the matter again.

Iron and Steel Bill

After a three-day debate last week the Iron and Steel Bill was read a second time in the House of Commons and the necessary Money Resolution was carried.

Industrial Gas Turbines

Comparison with Diesel-Engine Generators

GAS turbines for industrial power are discussed in a paper presented by Mr. R. J. Welsh to the Diesel Engine Users Association in London last week. The paper is intended to be an introduction to elementary principles, to help prospective users to understand why and how an i.c. turbine works. The author therefore starts with an explanation of the simple cycle, five possible ways of improving it and the reasons why it is frequently advantageous to subdivide the machine or its parts.

Increasing the maximum temperature of the working "gas" is regarded as the simplest, most effective and reliable way of improving the cycle. Raising the efficiency of the turbine by 6 per cent will increase the thermal efficiency of the whole plant by one-third, but ultra-high efficiency makes the plant extremely sensitive to slight variations of blade form, angle and clearance, thus necessitating extreme accuracy of workmanship and more maintenance, which increase the cost.

Most makers to-day compromise on thermal efficiencies corresponding to fuel consumptions ranging from 0·43 to 0·55 lb per h.p.-hour, which figures seem high to engineers accustomed to diesel engine practice. Nevertheless the economic aspects do not differ widely. The author's figures indicate a balance in favour of the diesel engine of only 0·067d. per kWh generated, or less than 6 per cent, which might easily be outweighed by reduced maintenance and attendance charges on the gas turbine, or by the lower capital cost of the smaller buildings required.

Gas turbines can at present be built economically only in sizes of from 1,000 to 15,000 kW and the closed cycle arrangement is best suited to sizes greater than 30,000 kW. Their advantages over Diesel engines are stated to be easier maintenance, greater reliability, lower first cost, less lubricating oil and cooling water, smaller dimensions, less vibration, absence of cyclic variation and greater starting torque.

London Medical Exhibition

Electrical Appliances for Diagnosis and Treatment

EVIDENCE of greatly increased use of electricity both in the diagnosis and treatment of illnesses was very conspicuous at the London Medical Exhibition held at the Royal Horticultural Hall, London, last week. A selection of the wide range of electromedical appliances produced by Philips Electrical, Ltd., included a "Cariotron" direct-writing electrocardiograph; the "Metalix 300" short-wave diathermy apparatus; the "Philistat" electrotherapeutic unit, which incorporates an electronically-actuated faradic circuit variable over the frequency range, 1 to 60 per second; the "Biosol" ultra-violet apparatus; and the "Triosol" equipment for ensuring the accurate administration of ultra-violet, infra-red and radiant-heat therapy. Besides representatives of its many standard and portable ultra-violet and infra-red equipments Hanovia, Ltd., showed an air sanitizer and a fluorescenct lamp for diagnosing skin diseases.

A new infra-red lamp for local heat-treatment was shown for the first time by Aerosols, Ltd., manufacturers of the "Aerolyser" electric inhaler and the "Phantomyser" electrical equipment for air disinfection. The "Infradyser," as it is called, takes the form of a small hand-lamp which the patient can apply over the affected part for the necessary period of, say, 25-38 minutes without discomfort. It is claimed that the hyperæmia induced lasts for 4-5 hours instead of the normal 30 minutes. Standard and table models are also available.

Various types of ultra-violet, infra-red, galvanic and faradic portable sets and other electromedical instruments were to be seen on the stand of John Bell & Croyden, who also introduced their new "Belclere Monomite" hearing aid. Finished in silver and rhodium, this instrument weighs only 6 oz and measures only 3¼ in. by 2½ in. by ¾ in., yet contains both h.t. and l.t. batteries and a three-valve amplifier. It is believed to be the first British hearing aid to employ a silver printed circuit on the chassis, thus eliminating all wiring. The same company showed audiometers and an amplified stethoscope. An example of the latter was also to be found on the stand of Chas. F. Thackray, together with an electric suction pump. Hearing aids of all types, including a number of bone conduction models with valve amplification, are made by the Telephone & Microphone Co., Ltd.

Improvements have been incorporated in the ophthalmoscopes made by C. Davis Keeler, Ltd., while new diathermy apparatus of the spark-gap type specially designed for ophthalmic use has been developed by Theodore Hamblin, Ltd., whose products also include electrical revolving test types. Operating and inspection lamps were exhibited by Rayner & Keeler, Ltd., and electrical cast cutters by the London Splint Co. Further examples of diathermy equipment were to be seen on T. H. Spicer & Son's stand. Kaylene, Ltd., demonstrated for the first time the Waterfield halometer for measuring the diameters of red blood cells. Electric sterilizers were displayed by the Amalgamated Dental Co., Ltd., and W. H. Bailey & Son, Ltd.

Bicycle and Motor Cycle Show

Design of Electrical Accessories

THE twenty-fourth International Bicycle and Motor Cycle Show at Earls Court was the first of its kind to be held for ten years (it closed on Wednesday of this week) and it was very evident that many improvements have been made to the mechanical construction of bicycles and motor cycles, but on the whole comparatively few changes have been made in the associated electrical equipment. Headlamps and other such accessories have been streamlined, but essentially they are the same as before. There is also a trend towards coil ignition for motor cycles, but it has by no means become general practice.

Most electrical interest is centred on the design of generators, in particular a.c. types, two examples of which were exhibited by Joseph Lucas, Ltd. They operate on the inductor alternator principle and are rated at 45 W and 55 W respectively, the former being fitted with a contact breaker for the ignition system of single cylinder machines. A full-wave dry-plate rectifier is used in conjunction with this type of generator so that d.c. only is used, a "floating" battery system being employed in the conventional manner. The main advantage of a.c. generation is obvious in that no brushgear is necessary, thus permitting an extremely robust and durable construction.

The British Thomson-Houston Co., Ltd., was showing a twelve-pole 6 in. diameter a.c. generator of the type developed for W.D. motor cycles. The d.c. generator and ignition unit was specially designed for the Velocette 150 c.c. twin-cylinder motor cycle and is an example of collaboration between motor cycle and assessory manufacturers to achieve compactness and neatness in design. It includes a 6-V permanent magnet d.c. generator giving an output sufficient for a 24-W headlight and coil ignition, a patented

ignition coil noteworthy for its low current consumption, an automatic cut-out, contact breaker cam and gearwheel assembly incorporating an automatic timing device, and a twin-cylinder distributor.

The a.c. generator is so constructed that it may be mounted in the crank-case with no adverse effects from hot lubricating oil. It has an output of 36 VA at 1,000 r.p.m. and a voltage regulation of 6 to 7·25 V over a speed range of 1,000/5,000 r.p.m. For a.c./d.c. equipments it is used in conjunction with a dry plate rectifier. Although contrary to conventional practice, the headlamp is connected directly to the generator, thus relieving the battery of the heaviest load, permitting the use of a small rectifier and, if desired, a smaller battery than usual.

Some ultra-lightweight machines with 125 or 150 c.c. two-stroke engines incorporate "flyweight" magneto ignition and a.c. lighting, while others are equipped with rectifiers and accumulators, thus dispensing with dry batteries for parking lights which are otherwise necessary.

Metal Prices

INCREASES IN AVERAGE OFFICIAL MARKET QUOTATIONS

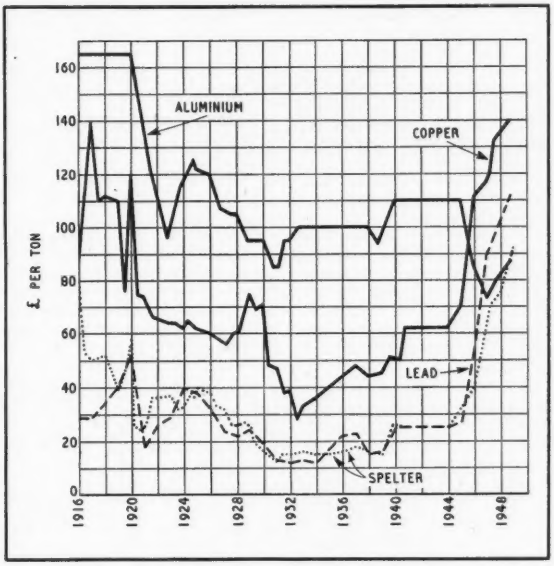
From a Correspondent

OF the officially announced increases in metal prices from October, 1948, the outstanding ones are lead, £90 to £112 per ton; spelter (zinc), £75 to £92 per ton; copper, £132 to £140 per ton; and aluminium, £80 to £87 per ton.

Many manufacturers in the electrical industry will be concerned, particularly by the 24½ per cent rise in basic lead prices. It was not wholly unexpected, but the rise is far greater than what took place after the 1914-18 war. The graph shows that the peak figure was not maintained for long and that three years after (in 1921) the price dropped considerably. At that time raw metal prices were largely controlled by the London Metal Exchange even for Germany and France. Nowadays, control has passed to the United States. There, the price to-day for lead is £120 per ton, notwithstanding that about one-third of the world's production of lead comes from Mexico and the United States. An increase in the price of accumulators has not yet been announced; the lead-acid battery is already 100 per cent over the pre-war figure and the alkaline one about 60 to 70 per cent. There is one small consolation to the battery user in that the selling price of scrap lead plates has gone up to about £65 per ton.

Manufacturers of lead-covered cable are considering the use of aluminium alloys in place of lead, but aluminium has increased nearly 10 per cent. A further extensive demand for this metal is probable in a new direction-owing to the steel shortage, for making oil pipe, lines of a manganese-aluminium alloy.

As for zinc, sometimes called spelter, its numerous and varied applications are well known, the good results obtained by zinc spraying of the metal suspension chains of the Menai Bridge in 1939 may possibly create a considerable demand for this method of treating steelwork construction and similar trades, but the cost of this metal has now gone up 22½ per cent.



Average prices of copper, soft lead (ingots), aluminium and spelter, 1916-48

Shenfield Scheme

Feeder Cables and Overhead Equipment

ELECTRIFICATION of one of the busiest railway lines in the world, the Liverpool Street-Shenfield section of British Railways (Eastern Region) out of London, which was suspended during the war, was resumed in 1945 and is expected to be completed early next year.

B. I. Callender's Cable Co., Ltd., is doing the track bonding, supplying the feeder cables between the track and substations and erecting the d.c. 1,500-V overhead current collecting equipment. The main catenary is of 37/·104 in. (0·321 sq in.) hard drawn copper, from which is suspended an auxiliary catenary of 19/·112 in. (0·191 sq in.) hard drawn copper; from the latter is suspended the contact wire of cadmium copper with a cross section of 0·3 sq in. For sidings, a simple catenary system is being used of 7/·143 in. (0·114 sq in.) cadmium copper, the contact wire being similar to that on the main lines.

Mechanical Independence

A feature of this scheme is that the equipments on the various tracks have been made "mechanically independent." Since the volume of passenger traffic is exceptionally heavy, it is important that any breakdown that occurs through a fault in the overhead equipment should be localized. Hence the contact wires on the various tracks on the open route are not registered through steady arms fitted to a common cross-span wire crossing all tracks from mast to mast; instead, separate Y-frames for each track are suspended from the bridge of the supporting structure and each contact wire is held in position by a steady arm fitted to an insulator on the end of a Y-frame. Mechanical independence is restricted in stations and junctions where the wiring is very complicated.

The structures are of two distinct types. Supporting structures for two, three, or four tracks are of simple broad flange beams. There is very little fabrication, they are easily cleaned and painted and the risk of obscuring a signal is reduced considerably. Anchor or terminal structures are of the normal lattice type, as are also the larger supporting structures spanning more than four tracks of the electrified line.

Foundations for the broad flange beam structures are of the side bearing type. Cored holes are left in the foundation blocks into which the masts are later dropped. When the masts have been correctly levelled the cored holes are filled with concrete. The larger fabricated structures are fixed to foundation bolts grouted into foundations.

The running out of the catenaries and contact wires, over 900 tons of copper, is now in progress.

Central London Line

Extension Inaugurated

LAST week Mr. Alfred Barnes, Minister of Transport, opened a further extension of the Central London Railway when he drove the first train from Greenford to West Ruislip. The Central London Railway has been extended at both ends, from Greenford to West Ruislip in the west and from Woodford to Buckhurst Hill, Loughton, Roding Valley, Chigwell, Grange Hill and Hainault in the east. The extension, which has cost £2,000,000, adds a further ten miles to this railway and the total underground network is now 243 miles with 278 stations.

Speaking at the opening ceremony, Lord Latham (chairman of London Transport) said that this latest extension constituted the largest opened for the last thirty-one years, and it was expected that 6½ million passenger journeys annually would be made. Important improvements in the operation of the whole Central Line would be brought about by the access to a new depot at Ruislip which accommodated nearly 500 cars. The opening of the extension coincided with the completion of the change-over to passenger-operated push-button door control on Central Line trains.

Sir Cyril Hurcomb (chairman of the British Transport Commission), said he was conscious that there were other areas for which more had to be done. If they could get the necessary powers and freedom to employ labour and use materials, the Commission would be ready to do all it could to give practical expression to the desires for the betterment of London Transport.

Sir Eustace Missenden (chairman of the Railway Executive) said that the new extension was another instance of the British Railways and London Transport joining forces further to improve railway facilities in Greater London area.

Automobile Specifications

ALL standard specifications relating to motor vehicles, including those transferred to the B.S.I. from the S.M.M. & T. series, have been brought together in "BS Handbook No. 8" which is available for 15s. post free from the British Standards Institution, 24, Victoria Street, London, S.W.1. This 335-page book is to be edited every two years for the addition of fresh material. Its electrical bearing is upon the standardized dimensions of batteries and their terminal posts, cable connectors and sockets for cars and commercial and public service vehicles; also the dimensions of distributor and timing plate mountings and of carbon brushes for ignition purposes, as well as of brushes, flex and terminal tags of dynamos and engine starters. Reference is also made to many general engineering standard specifications which are relevant to automobile engineering.

COMMERCE and INDUSTRY

Supervisors' Salaries. Electronic Control Applications.

AGREEMENT has been reached between the National Federated Electrical Association and the Association of Supervising Electrical Engineers whereby, from 1st November, minimum salaries for supervisory staff will be increased by £65 per annum in London and £60 per annum in other districts. The new rates are as follows:—Staff foremen: London £416 per annum; other districts £385. Staff foremen (supervising): London £465 10s.; other districts £422 10s.; supervising electrical engineers: London £515; other districts £460. These minimum salaries are subject to an addition of 25 per cent for cost of living and they apply to members of the A.S.E.E. employed by N.F.E.A. members.

Electricians' Wages

The official journal of the Electrical Trades Union states that the offer of the National Federated Electrical Association, in reply to the Union's application for a substantial increase in wages, to consider a proposal for an automatic adjustment based on the Index of Retail Prices was "wholly unsatisfactory." The matter has now been referred to the National Arbitration Tribunal.

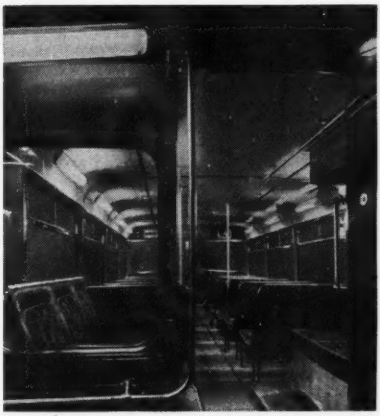
Mr. Sylvester Released

On 16th November the Israel Supreme Court quashed the conviction by the Jerusalem District Court of Mr. F. W. Sylvester, an employee of the Jerusalem Electric and Public Service Corporation. Mr. Sylvester had been charged with espionage and the illegal use of a radio transmitter and sentenced to seven years' imprisonment. The Supreme Court held that this judgment could not stand for lack of evidence. It was reported that Mr. Sylvester was leaving Palestine for England last week.

Fluorescent Bus Lighting

Two new buses recently placed in service in Leeds and Oldham have been equipped with fluorescent lighting using "Osram" 1½-ft, 15-W lamps in G.E.C. fittings. In the Leeds Corporation Transport bus the lamps are enclosed in fittings of special design having a reeded "Perspex" centre portion and translucent opal ends, the effect being to impart a light appearance to the whole fitting by avoiding undue contrast between the luminous portion and the ends. There are nine lamps on the lower deck (including one on the conductor's platform) and the upper deck is lighted by ten lamps, the average illumination being 10-12 lumens per sq ft. Power is taken at 110 V, 400 cycles from an invertor driven by a 24-V battery.

The installation in the Oldham bus comprises twenty-one fittings and there are in addition concealed fluorescent lamps to illuminate the front, rear, and side route and destination indicators. The fittings consist of a reeded



G.E.C. fluorescent lighting in a Leeds Corporation bus

"Perspex" base with hinged plated end caps over the lampholders, the lamps being exposed and readily accessible for replacement.

Both these buses were exhibited at the Commercial Motor Show at Earls Court in October.

Electronics in Research and Industry

When he opened the first electronics symposium to be held by the Scientific Instrument Manufacturers' Association in London last week, Sir Edward Appleton, secretary of the Department of Scientific and Industrial Research, intimated that electronic control equipment should be even more widely used than it is to-day and that every industrial concern should continually be asking itself if some operation or other could not be performed more effectively by means of an electronic device. He also said that the D.S.I.R. had set up a small advisory group of experts who visited firms and assisted in the identification of operations when the possibility of using automatic and other electronic equipment was worth investigating.

The symposium itself consisted of two days of lectures and discussions on contemporary practice, the first dealing with scientific research, including such topics as computing, frequency measurement, the measurement of ionising radiations and a comparison between the

measurement of small displacements by electrical and electronic methods. On the second and last day the papers were related to industrial applications. The subject matter included ultrasonics, metal detection, sound and vibration measurement, spectroscopy and an outline of some recent developments in picture telegraphy.

Radio Interference Suppression

In order that M.P.s might get a clearer idea of radio interference suppression technique and the costs involved, a well-known manufacturer of this type of apparatus held a demonstration in London last week at which many Members were present. Essentially, there were four demonstrations, three with ordinary radio sets and one with a television receiver. In conjunction with the radio receivers, electric razors, vacuum cleaners and thermostatically controlled irons were shown both with and without suppressors giving a very clear indication of the effectiveness of the method employed. As it was impossible to use a motor car engine, the ignition of which radiates most of the interference caused to television reception, two aerials were employed, one 30 ft from the ground near heavy traffic and the other 120 ft high out of the range of such interference and simulating the conditions which would obtain if all motor vehicles were fitted with suitable suppression devices.

New L.C.C. Flats

Weston House, Kingshold Estate, Hackney, the first flats of post-war design to be completed by the London County Council, were officially opened on 18th November by Lord Morrison, Parliamentary Secretary to the Ministry of Works. The new flats, of which there are forty of 2-5 bedroomed types, show various improvements compared with their pre-war counterparts. Well equipped electrically, they have the new standard 13-A fused flat-pin plug points in every room. Provision is made for either an electric or gas cooker, while an electric wash-boiler is a part of the standard equipment. For heating water when the back-boiler is not in operation there is an immersion heater, and the first bedroom has a 2-kW " inset " electric fire. An automatic lift serves all floors. The electrical contractors were Archibald Saville & Co., Ltd.

" Electrician " Tables

The 1948-49 edition of the *Electrician* Annual Tables of Electricity Undertakings (Benn Bros., Ltd., Bouverie House, 154, Fleet Street, London, E.C.4, 21s., including postage) was produced under difficulties for the nationalization of the electricity supply industry took place during its preparation. Nevertheless the " tables " are remarkably complete, although it has been necessary to omit the names of some of the officials in a number of instances. The customary information is given under place-names (system of supply, tariffs, etc.) and the names of the appropriate Electricity Boards sub-areas, etc., are now added. A little difficulty has cropped up in connection with generating plant and the editor has had to cover this in the same way as before, i.e., by placing it in the areas of the various former undertakings.

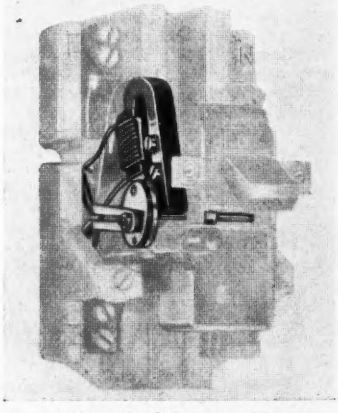
In addition to the home section there are the usual tables for the British Commonwealth and for foreign countries. This last section is necessarily representative rather than exhaustive. The new size of the volume (9 in. by 6 in.) is an improvement.

New P.O. Journal

The first issue of a new quarterly G.P.O. publication has appeared with the name *Telecommunications Journal*, priced at one shilling. It bears a likeness to the old *Telegraph and Telephone Journal* which in 1914 took the place of the *National Telephone Journal*, its main objects being to afford some degree of permanence to papers delivered before local groups and a means of discussing administrative and executive topics. It will in its own sphere be complementary to the *P.O. Engineering Journal* as well as to the *P.O. Magazine* and to *Traffic*, which started at the beginning of this year.

Overload Earth-Leakage Breaker

The normal kind of earth-leakage circuit breaker is now being made to afford overload protection by Siemens Electric Lamps & Supplies, Ltd., 38, Upper Thames Street, London, E.C.4. It is available in a.c. 30- and 60-A sizes, double pole.



Earth-leakage circuit breaker without case showing thermal overload trip

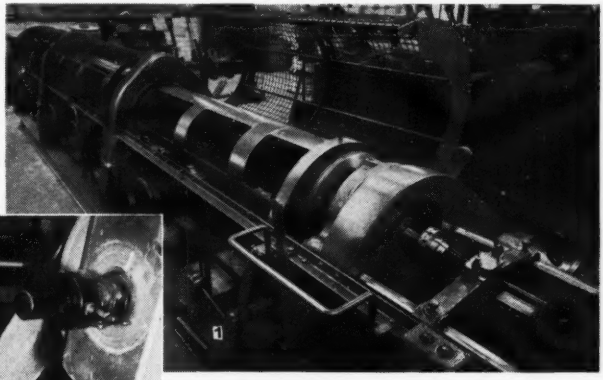
Operation is very quiet and quick upon the occurrence of a short circuit, but a thermal time-lag ensures that only sustained overload

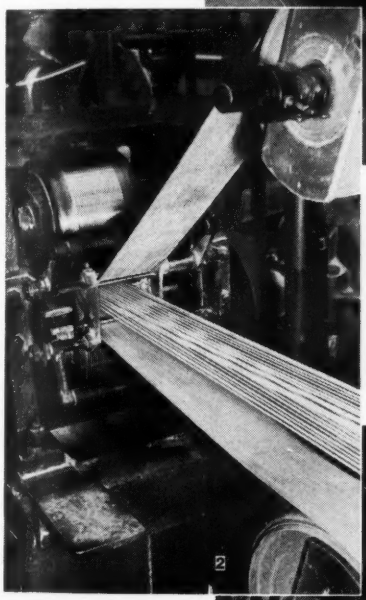
Special Cables

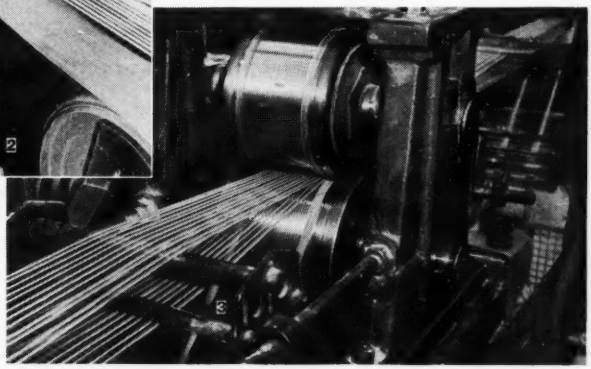
MEETING REQUIREMENTS FROM OVERSEAS

NO matter how complicated the design or how large or small the quantity needed, the Sterling Cable Co., Ltd., prides itself on meeting its customers' requirements for cable. A speciality is made of types of cable suitable for extreme climatic and other exacting conditions encountered abroad and at the moment nearly 70 per cent of the company's total output is absorbed by orders received from customers overseas.

To meet the greatly increased demand for its products, the company has, during the past few months, transferred its main production from Enfield to a factory double the size at Aldermaston, Berkshire, another works at Warrington being employed exclusively for paper-insulated cables. A remarkable feature of the move was that, far from losing production owing to plant being out of service, output actually increased by 15 per cent. This was made possible by spreading the transfer over a period of eighteen months







1—Typical conductor stranding machine

2—Wires and rubber strips entering grooved rolls of covering machine

3—Exit view of longitudinal rubber covering machine

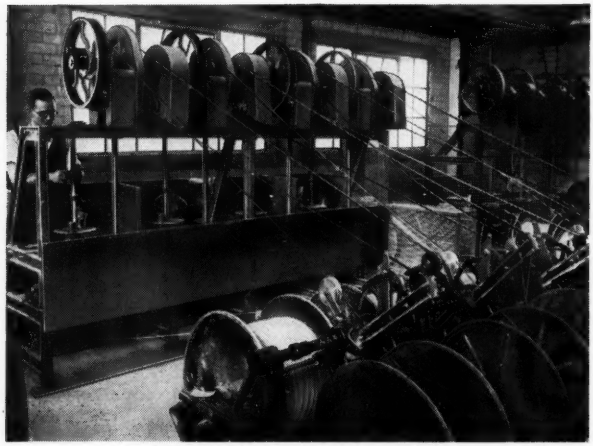
and by working some machines overtime while their counterparts were being moved.

Running alongside the main-line railway from London to the West Country, the new factory, which occupies a total production area of 80,000 sq ft, comprises six adjoining blocks, 80 ft wide and of varying length, the whole length of the works from one end to the other being 1,000 ft. Nearest the main entrance are the offices and canteen with behind them the finished stores, plastic extrusion and impregnating department, raw material stores, stranding and braiding department, and rubber covering section.

Manufacturing operations commence at the centre of the factory with the stranding of the conductors. Here on stranding machines any number of wires up to thirty-seven can be built up into perfectly symmetrical conductors. For the small section flexible conductors bunching is usually adopted ; in the case of larger flexibles the bunches are stranded together to make the final conductor.

The multi-wire conductors then go to the appropriate departments for covering either with rubber or plastic. Calendering machines press out unvulcanized rubber into strips 10/1,000 in thick and 42 in wide. These are protected by linen cloth until needed and are cut to the required width by slitting machines. Small section conductors are insulated on longitudinal covering machines, the largest of which takes up to twenty-four wires. In these machines pairs of semi-circular grooved chrome-steel rollers squeeze the soft rubber strips closely round the conductors. For 250-V cables two layers of rubber are normally used, three layers being applied to 660-V types. For recognition purposes the final layers are of different colours according to whether they are for live, neutral, earth, etc. When we visited the factory special cables with very fine conductors, 26/·0036 in, were being prepared for a special job in Sweden.

For heavier section cables the insulation is applied by lapping machines which wind the rubber round the conductor in a close helix. Colliery trailing, welding and similar types of cable are insulated in this way.

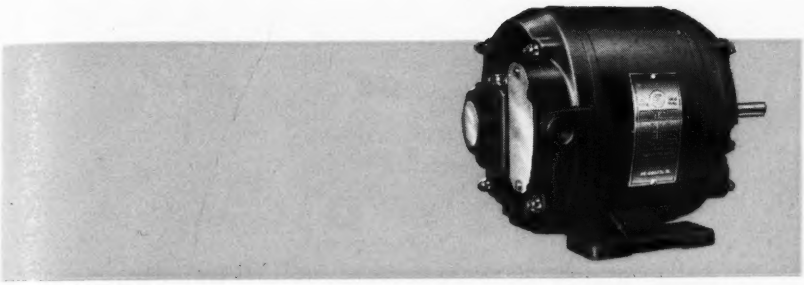


Part view of horizontal taping machines

After the rubber is applied, the insulated core is passed through a chalk bath and fed on to take-up drums and, as at several other points of the manufacture, automatically measured. From the drums it is either first taped, if required, or packed on to perforated-steel cylinders ready for vulcanizing. The taping machines are of either horizontal or vertical types, each operating on the same principle. From a pay-out stand the wire is pulled through the lapping head by a power-driven capstan and re-wound on a take-up drum on the back stand, the whole being synchronized to maintain even tension.

The perforated-steel cylinders on which the core is vulcanized are taken on trolleys to the vulcanizing vessels. These are arranged for curing by means of steam at pressures of 40 lb per sq in. and over. Vulcanizing times vary from about 30 minutes to an hour. Charts keep a complete record of curing operations for every batch of cables.

Cotton, silk, asbestos or similar textile



Standard 'English Electric' Fractional Horse Power Motors from 1/20th to 1 H.P. are available for direct current, single-phase or three-phase supplies. The range of standard enclosures and mountings meets the requirements of most applications. If your problem requires special care, 'ENGLISH ELECTRIC' engineers are ready to help you in every way.

Motores tipo normal 'English Electric' de potencia fraccional en caballos desde 1/20 hasta 1 CV se hallan disponibles para el suministro de corriente contínua monofásica o trifásica.
La série de cubiertas y monturas comprende una variedad de modelos para satisfacer la mayoria de aplicaciones.
Si su problema necesita atención especial, los ingenieros de la 'ENGLISH ELECTRIC' están a su disposición para ayudarle en cualquier asunto.

Motores tipo normal 'English Electric' de potencia fraccional em cavallos desde 1/20 até 1 CV são disponíveis para fornecimentos de corrente contínua monofásica ou trifásica.
A série de cobertas e monturas compreende uma variedade de modelos apta a corresponder às exigências da maioria das applicações.
Se o seu problema necessita atenção especial, os engenheiros da 'ENGLISH ELECTRIC' estão à sua disposição para ser-lhe úteis em qualquer assunto.

THE ENGLISH ELECTRIC COMPANY LTD.
Queens House · Kingsway · London W.C.2.

The above is only a representative selection of the 75 different lines produced by us and we will gladly furnish further details on request.

CLANG

TRADE MARK

ELECTRICAL ACCESSORIES

are available at your local wholesaler

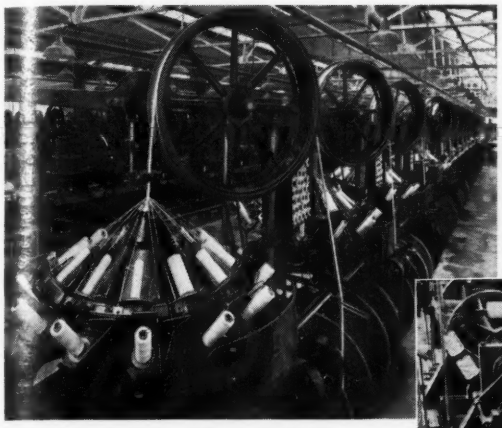
MADE IN ENGLAND

CLANG LTD., CROWN YARD, CRICKLEWOOD LANE, LONDON, N.W.2

Tel.: GLAdstone 4201 (4 lines)

Telegrams : Clanglim, Crickle, London

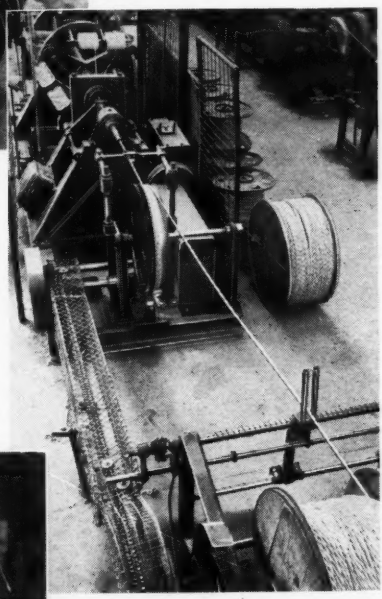
coverings are applied by braiding machines, of which there are 300 arranged

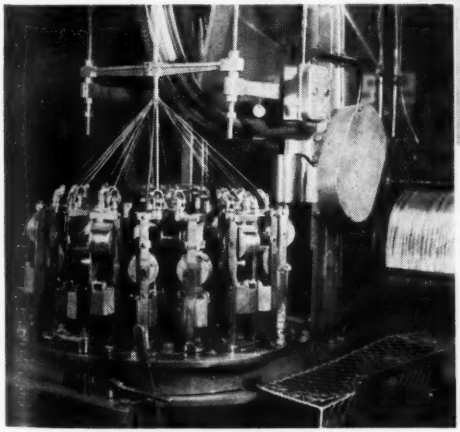


Battery of textile braiding machines

in groups of 12. A new type of machine, developed during the war and now being used, is very much faster in operation than the customary types which were previously in use.

For tough rubber sheathing the protective rubber compound is first softened and rolled out in warming mills, incorporating two steam-heated rollers 20 in. in diameter and 48 in. long. The rollers revolve at slightly different speeds, thus creating a kneading effect. When sufficiently pliable the rubber is cut off into strips by the operator and passed to extrusion machines. Here the rubber is force-fed by a roller and screw into a steam-heated head. Single or multiple cores are introduced through a conical point into the pressure chamber and emerge through an orifice of required shape surrounded by the protective rubber sheath. After cooling in a water trough the cable is panned and vulcanized.





Multi-core cable laying-up machine. (Left) Close-up view of wire braiding machine for screening cables

Multi-core cables are built up on laying-up machines which are similar, though larger, to those used for wire stranding. In course of construction when we visited the department was a 660-V four-core 7/·070 in. power cable for the Argentine market. After being given a tough

rubber sheathing it was lapped with a prepared textile tape, vulcanized, and despatched to the Warrington works for lead covering and steel wire armouring.

In the impregnating shop v.i.r. cable is treated in baths of red, yellow, or black wax to increase the weatherproofing qualities of the covering and provide a distinguishing colour. Plastic coverings, applied in a similar way to rubber extrusions, are used on special types of cables employed in high-voltage, high-frequency, radio and television work. The polythene, p.v.c., or other plastic material is fed into the extrusion machines in chip form, being softened in passing through the extruder into the heated head.

Every cable is given pressure and insulation tests and, finally, a percentage of the output is pressure tested while immersed in water. Among orders in hand for overseas customers are television camera cables for the U.S.A., power transmission lines for a South American Republic, multi-core telephone cables for New Zealand, low temperature resisting cables for Sweden, welding cables for the Netherlands and rubber and plastic insulated wire for almost every country in the world.

The company is associated with a leading firm developing electronic devices. It is thus enabled to advise overseas customers on cable specifications for this highly specialized modern technique.

Warming up "flex" before testing

"BRUSH" EQUIPMENT FOR EXPORT

THE Brush Electrical Engineering Co., Ltd., is at present building for export to South Africa two 12,000-kVA banks of 110-kV single-phase transformers (each with one spare unit), designed for use on a system earthed by Petersen coil in a heavy lightning area. The first bank, which is provided with off-circuit tapping switches, is now nearing completion. The second bank is to be equipped with on-load tap changing gear and will not be finished for some months. The company also has in hand a similar 10,000-kVA, 110-kV bank of single-phase transformers equipped with on-load tap changing gear for New Zealand where again severe lightning conditions are to be expected.

At present undergoing test at the works at Loughborough is a 1,250-kW axial-flow geared back-pressure turbo-alternator set for a herring factory in Iceland. Similar units are under construction for various installations in South Africa.

Among interesting switchgear contracts in hand is a 19-panel low-voltage board for a cement company in Chile. This installation includes some 1,000-A, 2,000-A and 3,000-A vertical isolation draw-out pattern oil circuit breakers. More than a hundred vertical isolation draw-out circuit-breaker equipments and a number of wing-isolator units are on hand for the Municipality of Springs, South Africa. A 13-panel switchboard, including five 1,200-A, 6·6-kV, 250-MVA oil circuit breakers is being built for the British Columbia Pulp and Paper Co. Also under construction are several switchboards for the Andrew Yule group of power companies in Southern India.

GOOD FROM ALL ANGLES!

UNIVERSAL MULTIRANGE METER

MODEL 125A
17 RANGES

Designed for Electrical Power and Telephone Engineers

- **Moving Coil Movement**
- **A.C. & D.C. Volts 7.5 to 750 Full Scale**
- **D.C. Current 3 mA to 15A Full Scale**
- **Resistance 0.2 to 100,000 Ohms**
- **Overload Protection**

IMMEDIATE DELIVERY

WRITE FOR FULL DETAILS OF THIS AND OTHER TESTING EQUIPMENT

WINDSOR and TAYLOR
Best for TEST EQUIPMENT

TAYLOR PRODUCTS INCLUDE: MULTIRANGE A.C. D.C. TEST METERS ● SIGNAL GENERATORS ● VALVE TESTERS ● A.C. BRIDGES ● CIRCUIT ANALYSERS ● CATHODE RAY OSCILLOGRAPHS ● HIGH AND LOW RANGE OHMMETERS ● OUTPUT METERS ● INSULATION TESTERS ● MOVING COIL INSTRUMENTS

TAYLOR ELECTRICAL INSTRUMENTS LTD ● 419-424 MONTROSE AVENUE, SLOUGH, BUCKS, ENGLAND

Telephone SLOUGH 21381 (4 lines)
Grams & Cables "TAYLINS" SLOUGH
Scientific

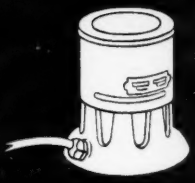
VICSOL
(REG. TRADE MARK)

INDUSTRIAL ELECTRIC HEATING APPLIANCES

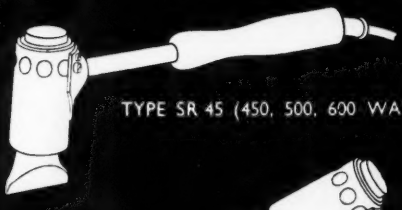
ST 7 (70 WATTS)

SR 8A (80 WATTS)

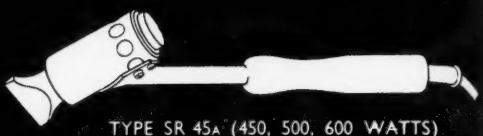
MP 10 (100 watts)



MP 30 (300 watts)



TYPE SR 45 (450, 500, 600 WATTS)



TYPE SR 45A (450, 500, 600 WATTS)

"VICSOL" Electric Soldering Irons

Constructed for continuous production soldering to meet every industrial need.

Consider these important advantages:—

HIGH SPEED SOLDERING — UNIFORM PERFORMANCE
LONG LIFE and LOW MAINTENANCE
PERFECT BALANCE — RAPID SERVICING

Complete standard range 25 to 600 watts in voltages 6 to 250 A.C. or D.C.

"VICSOL" Metal Pots and Ladles
From 4 lb. to 50 lbs. capacity
With or without auto-control

"VICSOL" Glue Pots (Wet and Dry)
From 1 quart to 3 quarts capacity
With or without auto-control

Further particulars from the Manufacturers —

T. LEEMAN, 34 PALMERSTON RD., LONDON, W.3

CONTRACTORS TO THE G.P.O.

Melbourne automatic trunk exchange : General view of the operating room
Photograph reproduced by permission of Australian Post Office

Long Distance Telephony

AUTOMATIC TRUNK NETWORK

SIEMENS BROTHERS & CO., LTD., designed and manufactured the successful Capetown automatic trunk switchboard, claimed to be the first in the world to handle all classes of trunk calls on a semi-automatic basis, that is, by means of automatic switching equipment controlled by telephonists at cordless switchboards. The equipment was put into service in 1933 and employed bi-motional switches of the same type as those used in local automatic exchanges.

The improved automatic trunk switching system which Siemens Brothers have developed is of completely new design, and includes a number of unique automatic features which co-ordinate ingeniously to give such rapid connections and such a wide range of facilities that telephonists can establish any trunk call over any type of connection and across any distance with the ease and speed of a local call.

When subscribers in a local city area originate a trunk call they dial a certain digit and are routed to the automatic trunk exchange, where the calls are queued as they enter and are distributed by high-speed switches, in correct order, to any one of a number of telephonists. The telephonist proceeds at once to establish the required connection, and in most cases the caller is able to speak to someone hundreds of miles away immediately after making his request. Incoming calls from other towns on main trunk routes are dialled by their controlling distant telephonists direct to subscribers in the local city area. All telephonists have similar facilities for making outgoing calls and have access to all trunk routes at normal times.

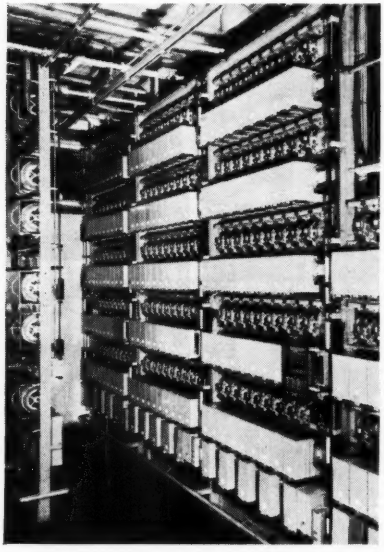
The cordless switchboards are neat in appearance and of low desk-like construction; their main equipment is a few keys, lamps, timing devices and a digit key strip. A general view is reproduced of such operating suites at the Melbourne automatic trunk exchange.

The motor uniselector employed is a motor-driven switch with the high speed of over 200 steps per second and a large bank capacity allowing access to many circuits, an ideal combination for fast hunting and selecting purposes. Complementary to this is a special high-speed relay which ensures complete fidelity of impulse repetition, a vital factor in the case of long-distance connections.

A voice-frequency method is contended to be the only entirely satisfactory system

of signalling and dialling. The Siemens Bros. system employs two frequencies, 600 and 750 cycles per second, which are transmitted as independent signals. It has been designed to ensure adequate immunity from false operation should the signal frequencies be present in speech, whilst giving faithful signal repetition with freedom from impulse distortion. These signals are transmitted over the actual talking channels, and can be sent over any type of line capable of passing speech, irrespective of distance.

A high standard of transmission efficiency is provided in the company's automatic trunk switching system, and in order that the overall efficiency of the longest connections will always be satisfactory and stable, provision is made for four-wire switching of trunk lines. Two special features are the queueing of



Local first selector racks in the Melbourne automatic trunk exchange. *(Photograph reproduced by permission of the Australian Post Office*

incoming calls, and the facility of " storing " calls when all outgoing trunks on a particular route are temporarily engaged.

The major development of the system was completed shortly before the war, which postponed its general application until 1945. The first order, however, was placed in 1938, by the Australian Post Office for the large automatic trunk exchange in Melbourne, with outlying voice-frequency equipment to serve the capital city and principal trunk routes of the State of Victoria. A fifth extension is under consideration to increase it to a size exceeding the requirements originally planned for 1958, including approximately 1,000 main voice-frequency trunk lines and 200 cordless-switchboard positions. Equipment for Sydney, Adelaide, Canberra, Brisbane, Perth, Geelong and other main centres is also on order, or being ordered.

In South Africa, also, the company's automatic trunk system has been adopted as the standard for the Union, and orders were placed immediately the war ended for automatic trunk exchanges and associated voice-frequency equipment for surrounding areas at Bloemfontein, Pietermaritzburg, Port Elizabeth and Durban. The last-named is being manufactured by another British firm to Siemens Bros.' designs. The provinces of Manitoba, Alberta and Nova Scotia have adopted the system, and orders are in hand for equipment for automatic trunk switching based on Winnipeg, Brandon, Edmonton, Calgary, Halifax, Truro and other important towns.

KINGSTON POWER STATION

EARLY in November His Majesty King George VI, accompanied by the Queen, opened the new power station at Kingston-upon-Thames—the first to be opened since the British Electricity Authority took over the electricity supply system in April last. As a souvenir of the occasion the British Electricity Authority has produced an illustrated brochure describing the plant installed. The station is of medium size; one 30,000-kW steam turbo-alternator was started up by the King, a second is to go into service soon and there will eventually be two further similar sets.

The brochure deals with the station from the foundations to the step-up transformers at the outgoing end, and many good photographs and drawings give a very good idea of the plant.

Lord Citrine, chairman of the B.E.A., contributes a concise account of the Authority and its organization.

Packing Electrical Equipment

SCIENTIFIC METHODS ADOPTED BY BRITISH EXPORTERS

S. C. C. NASH * **and J. F. JUPE,** A.M.I.E.E.

THE necessity for the British electrical engineering industry to export a large proportion of its products has led to an intensive study of export packing by many companies and it may be fairly claimed that British electrical goods are now the best packed in the world.

This scientific study of packing is exemplified by the "Packaging Code," published by the British Standards Institution. It is a substantial book, containing sections on choice of containers, corrosion prevention, methods of packing, handling of containers, marking and identification, paper and cellulose wrappers, wooden containers, textile bags, metal containers, glass containers, cushioning materials, cordage, closing and sealing tapes, tensional steel strapping and methods of test, and can serve as a definitive work on packing for the whole of British industry.

Although it is not generally realized, scientific packing starts on the drawing board, and long before the designer completes the form of an article he must examine his design with two questions in mind: (1) Has the overall volume of the equipment been reduced to a minimum?; and (2) Have all possible projecting members been made removable? In general the reasons for these requirements are economic and if the article is to bring business to its maker it must be sold as cheaply as possible in the overseas market, but this does not necessarily imply that it must be made as cheaply as possible in Britain.

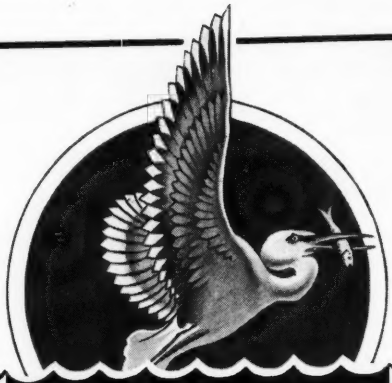
Fluorescent lamps being packed for shipment to New Zealand

Condition (1) is brought about by the fact that a considerable quantity of goods shipped abroad are freight charged on a volume basis, and "volume" in this case means the smallest rectangular space that will contain the article. Hence projecting members are bad unless as stated in (2) they can be made removable. If lack of attention to either of these points results in a packing case being increased in volume from, say, a 24-in. cube to a 28-in. cube the freight charges on the goods will have been increased by 58 per cent., apart from the cost of the larger case.

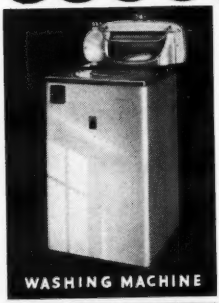
Effect upon Selling Price

If a British manufacturer did not take cognizance of this point it might well be that an American or European competitor would be able to undercut him in his landed cost abroad. An electrical appliance made by Messrs. A, of London, might cost 3s. less than Messrs. B's version of the same thing made in Brussels, but if B's cost was increased because the article could easily be taken to pieces for shipping it is quite conceivable that more than this amount would be saved in freight charges, and therefore his article would have the lower

* *Manager G.E.C. Export Despatch Department.*



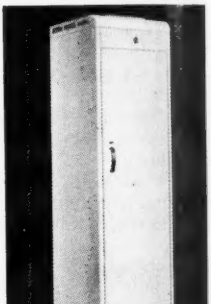
THE FISHER WAY

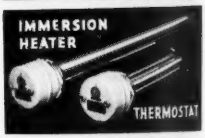


for Electric

WASHING
DRYING
CLEANING
HEATING
MIXING

in





HOME, INDUSTRY, SURGERY, DAIRY

Write for Catalogue to Dept. 11

H. FISHER (Oldham) LTD., OLDHAM, LANCS.

Makers of fine Electrical Appliances

Phone : MAIN 4628

Grams : HEATERS, OLDHAM

selling price when it stood in the showroom or shop overseas. It has therefore often been found that consultation between a designer and the export packing manager may result in a few more shillings being spent in making an article if in return its shipping volume is reduced.

Main shipping containers are generally a packing case, crate, cask, hinged (collapsible) corner box, fibreboard carton, or sack. The last is most suitable for comparatively small metal objects, such as bolts, and double sacks are widely used, with a plywood or metal label.

For items up to the weight and size of a domestic radio receiver and which are already pre-packed in a carton or fibreboard container the use of hinged-corner or collapsible boxes is considered good practice. In one instance their adoption reduced the breakage of glassware from 20 to 0·6 per cent. It has been proved very important, however, that the inner carton must fit the hinged-corner box very snugly, so that the wooden side of the box becomes in effect an outer layer of the carton.

Fibreboard cartons are very useful and are the answer to "bread-and-butter" lines when pre-packed in small cartons and there are great prospects of this method being used for export as soon as supplies of fibreboard cartons are available in very large quantities. Many companies use fibreboard for interior containers and in most cases they are specially designed for the particular article by a firm specializing in these containers, since experience has shown that this reduces damage in transit to the minimum, apart from the extra saving.

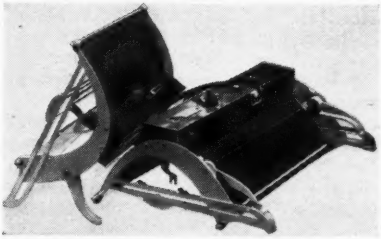
Casks are often used for dry goods. They are much cheaper than casks made for liquids and their use is advantageous because dockers and railwaymen will roll a cask where a packing case in similar circumstances would be turned over and over, with possible damage to the contents. This method of packing is admirable for glassware as so much space is saved compared with cases and there is a consequent reduction in importing charges. Experience has demonstrated that internal packing is of great importance where hollow glassware is concerned and such goods are generally tightly stuffed with straw or wood-wool. The reason for this is that if an article broke and it was not stuffed or only partly stuffed, its collapse would create a void within the container which would mean that adjacent articles could move and a mutual churning-up process would start.

Crates are sometimes useful for export work, providing that the products are already in containers, the latter being moderately large and well packed internally but with discretion consistent with the materials concerned. Wooden packing cases form the main type of container in which electrical equipment is sent abroad by British firms and if well made they are very satisfactory.

Experiments have shown that the strength of a case depends largely on the ends and these are made a little thicker than the sides. Battens increase the strength of the case, but they also increase the freightage charges and their use in cases of less than 24-in. side is not generally adopted. As an example of the unnecessary use of battening it may be pointed out that if a case of 24-in. cube had $\frac{5}{8}$-in. battens added the cost of freightage would be increased by 11 per cent. Another subtle point about packing cases which is not obvious is that edge joints of boards on two adjacent sides should not coincide, thereby resulting in a stronger case.

Waterproofing is extremely important for many shipments and a common and well-tried practice is to treat all joints of a packing case with a bituminous compound that remains soft indefinitely.

Occasionally it is thought worth while



The legs of the reflector fires made for export by Premier Electric Heaters, Ltd., can be quickly reversed for packing and just as speedily restored to their correct position, whilst the removal of the reflectors facilitates "nesting"

to use a zinc-lined case, but generally only to minimize fire risks when shipping celluloid accumulators or insulating varnish in stoneware jars. For normal export packing, one or more linings of bituminized paper inside the case, with or without compound on the joints in the woodwork, is usually sufficient. Particular care is given to cases which may have to travel a long way into the interior of a possibly tropical country by water, rail, camel or bullock-cart. Every consignment, however, is treated on its merits and the co-operative guidance of the customer with regard to climatic conditions, etc., is of great importance.

It is sometimes a problem whether oil-filled equipments should be shipped with the oil in place. In the case of switchgear, etc., the answer is obvious, but care is taken to see that dirt is prevented from entering the tank and that the oil is shipped in a clean container previously well dried. Transformers and oil-filled capacitors, however, are a different matter and no shipping manager removes oil from them unless he has received the positive assurance of the engineering section that they may be shipped without oil. These items of equipment have to be dried with extreme care before being immersed in oil and if the oil is removed for any length of time they may absorb moisture during transit which it would be difficult or impossible to remove when the equipment arrived at its destination.

Optimum Amount of Packing

An analysis of goods sent to all parts of the world has shown that internal packing is very important and where special cartons are not used, wood-wool, straw, etc., tightly packed around articles provides excellent protection. Contrary to what one might expect, the optimum amount of packing between the case and the goods has been found to be about 1 in.; an excessive thickness has been proved wrong. A 4-in. layer, for example, could not be packed so tightly and as its use would necessitate increasing the dimensions of the case, freight charges would rise. If, for example, a cubic case of 24-in. side and containing lamps had to be increased to 27 in. side because of unnecessary packing, the freight charges would increase by 44 per cent and the cost of shipping the larger case to, say, New Zealand would be about 14s. more.

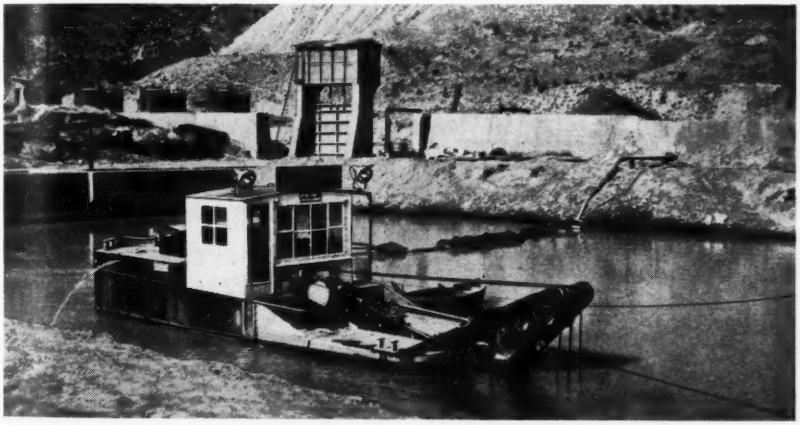
Where very delicate articles are concerned, such as long glass tubes used in neon signs, research has shown that the only way to guarantee freedom from damage during shipment is to use some kind of double container, the inner one being supported by springs allowing substantial movement in all directions. Tests with an accelerometer have proved that ordinary types of packing with such materials as sponge rubber, felt or corrugated paper, give little protection to very delicate equipment in cases that are dropped from various heights. A sprung type of suspension is much more effective though more expensive, but its use is certainly justified for goods of substantial value, e.g., a high power radio transmitting valve. One design uses 16 springs anchored in pairs at the corners of a welded framework of angle iron, the springs being secured to an inner box so as to give the maximum possible protection to the contents while at the same time keeping the framework as small as possible. Each pair of springs is given a resultant tension acting along a line inclined at 45 deg to the horizontal, with the box in any position.

Space does not permit mention of preservative packing and corrosion preventing methods. These subjects alone have been the cause of a tremendous amount of research, largely during the war, when it was absolutely essential for goods to arrive overseas in first-class condition and to remain so even if not unpacked for a considerable time after arrival. Methods of spraying plastics so that they are tough in transit, yet can be peeled like an orange, have been developed and chemists have given much attention to fungicides for impregnating felt, canvas, sacking, etc. Even oils and greases are not always so good as they would seem, from a corrosion-preventing point of view, and some encourage the growth of moulds on their surfaces. But British electrical equipment manufacturers are fully aware of these points and many more and are determined that their skill, time and efforts in producing for export shall not be nullified by wrong packing methods.

Electrically Operated Dredger

SUPPLIED FOR TURKISH STEELWORKS

FOR the purpose of clearing the silt from the sedimentation pond at the Karabuk Iron and Steel Works, Turkey, a 6-in. Gwynnes suction cutter dredger has been installed. This dredger is entirely electrically operated and the whole of the electrical machinery and control gear was manufactured by the General Electric Co., Ltd., in England, to the instructions of Gwynnes Pumps, Ltd., London, the main contractors. The equipment has now been in operation for several months and its performance has proved very satisfactory. Sludge density tests which have been carried out under full-load conditions have produced the favourable figure of 1·24-1·23.



Dredger at work in the sedimentation pool at the Karabuk Iron and Steel Works

Designed to dredge to a depth of 20 ft. below the waterline, the dredger handles 800 gallons per minute of silt and water, pumping this mixture through 90-100 yd. of 6-in. delivery pipe against a static head of 16 ft. The actual quantity of silt with which the dredger will deal is from 45 to 50 tons per hour.

The 6-in. dredging pump is operated through a hydraulic (oil-filled) coupling and V-rope drive by a G.E.C. 60-h.p., 380-V, 1,465 r.p.m., totally enclosed, fan cooled, squirrel cage motor. The incorporation of a hydraulic coupling in this drive made it possible to use a squirrel cage motor since the motor is started up light. Further, by making use of the slip obtainable with this coupling, the dredging pump can be run at a speed corresponding to the head against which it has to operate.

When dredging operations are in progress, the dredger is controlled by means of a four-barrel winch in the operator's cabin, which controls the movement of the cutter arm and operates the warping lines. The cutter gear and the hoisting and slewing winch are driven by a G.E.C. 20-h.p., 970 r.p.m., weather-proof squirrel cage motor. External floodlights and interior lighting are supplied from a 1,500-W, 3/1-phase, 380/110-V lighting transformer, impregnated for tropical use.

Control equipment for the 380-V incoming supply and for starting the two motors is provided in the form of a switchboard in the pump room. The incoming supply is controlled by a 150-A, triple-pole, oil-immersed, manually operated circuit breaker, with a triple-pole

interlocked isolator. Coupled to this is a steel plate cubicle with an externally operated interlocked isolating switch, containing two contactor type star-delta starters for the motors. All wiring on the dredger is carried out in Pirelli-General 660-V lead-covered cable.

At the recent annual meeting of the General Electric Co., Ltd., the chairman (Sir Harry Railing) mentioned other important overseas orders which the company was carrying out. Among them were a contract for two 25,000-h.p. turbo-alternators for Dublin; two 7,000-h.p. motor-driven blowers for the Steel Works of South Africa; orders for electric winders for South African mines valued at about £250,000; coal washing and preparation plant for the Tata Company's collieries, India; diesel locomotives for the Ceylon Government railways; electric locomotives for the Portuguese railways; railway signalling equipment for South African and Rhodesian railways; and communication and control equipment for an 800-mile oil pipeline in the Middle East.

Cable Contracts

OVERSEAS contracts recently undertaken by British Insulated Callender's Cables, Ltd., include the main cables for the Victoria State police headquarters in Melbourne. This handsome and up-to-date building houses telephone and radio communication equipment by which the headquarters keeps in touch with 388 police stations throughout the State. Eighty radio-equipped cars are also directed from the control room.

The company was responsible for the supply and laying of a three-core 11-kV submarine cable across the bed of Otago Harbour, New Zealand, for the Dunedin City Council to supply electricity to the residents of the Otago Peninsula. The paper-insulated, alloy-lead sheathed, single-wire-armoured cable was a mile long and the laying (illustrated) took only 45 min.

Laying a B.I. Callender's cable across Otago Harbour, New Zealand

Another cable-laying contract recently carried out by B.I. Callender's involved a telephone cable supplied to the Anglo-Portuguese Telephone Co., which was laid across the River Tagus at Lisbon.

COMMUNICATION EXPORTS

A GOOD proportion of the four main classes of communication equipment produced by the Automatic Telephone & Electric Co., Ltd., is exported. Among the orders in hand for automatic telephone apparatus is one for the re-equipment of the Dutch telephone service; 15,000 lines are being installed or the apparatus is in course of manufacture. Carrier telephone orders include contracts for Brazil, Portugal, Norway, British East Africa and Trinidad. These are being produced jointly by the company and the Telephone Manufacturing Co., Ltd.

Remote control systems are mainly for home purposes, but orders are being carried out for Iran, Calcutta, Haifa and San Paulo, Brazil. The company has recently installed or is now completing traffic signal systems for Holland (Tilburg), Sweden (Stockholm), New Zealand (Auckland and Newmarket) and South Africa (Durban).

will trip the switch, so avoiding actuation by momentary excess current caused for example by the starting of a motor. The device has an inverse time characteristic and is adjustable within setting limits. The earth-leakage feature remains as before, the trip coil functioning when the potential on the casing of the protected appliance reaches 22 V, with an additional 200 ohms resistance in the earth circuit. For circuits liable to violent short circuit faults it is recommended that the breaker be backed-up with h.r.c. "Zed" type fuses.

Indian Import Duties

The *Board of Trade Journal* for 20th November publishes a list of modifications in the Indian Customs tariff. This shows that electric motors are subject to a protective duty of 10 per cent *ad valorem*. A United Kingdom rate of duty of 24 per cent and a standard rate of 36 per cent are imposed on certain switch- and fuse-gear (less than 10 A but not exceeding 250 V), small insulated conductors and non-industrial line insulators (except electrical earthenware and porcelain otherwise specified. Against telegraphic and telephonic instruments (not otherwise specified), flashlights, condensers and bell apparatus and switchboards designed for less than 10 A but not exceeding 250 V, accumulators and batteries (not otherwise specified) and electro-medical apparatus an *ad valorem* revenue duty of 30 per cent is shown. On dry batteries there is a protective duty of 30 per cent.

Motors for Argentina

The firm of Ezra & Moises Tobal, Argentine textile manufacturers, are building a new mill near Buenos Aires, the machinery for which has been purchased in England. The reconditioning of the machines includes their conversion from shaft to individual electric drive and 165 motors, ranging from 1½ to 15 h.p., are being supplied for this purpose by the Hopkinson Electric Co., Ltd.

Facts About Philips

A new booklet, "Facts About Philips," has been produced by Philips Electrical, Ltd., drawing attention to the great variety of products manufactured by the company. This attractive publication is bright in appearance and style, profusely illustrated, and includes photographs of the larger factories. Brief mention is made of the range of products which includes radio, television, lamps, high frequency generators, industrial diamond dies, welding machines, medical equipment, etc.

Electricity in the Dairy

At the recent Scottish Dairy Show in Glasgow the E.D.A. Scottish Area Committee had a stand dressed up to look like an old barn with a red tiled roof on which there was a windmill gently turning. The stand was in three sections: an all-electric byre, a dairy, and a general display of electrical appliances for the dairy farmer.

In the byre, electrically heated elements were embedded in the floor to keep the cows pleasantly warm. In the dairy, an electric churn and automatic bottle-filling and discing machine were seen in operation and there was a new combined steam raiser and water heater capable of supplying adequate steam for sterilizing, and hot water for a wash-trough. An Essex mill and an electric sack hoist were other exhibits.

Mr. J. S. Pickles, chairman of the South-West of Scotland Electricity Board, speaking at an informal luncheon which preceded a tour of the stand, said that in the South-West Scottish area 43 per cent of the agricultural holdings of over 50 acres were connected to the supply.

Derby Sub-Area Office

The telephone number of the East Midlands Electricity Board Derby Sub-Area office at 36, Full Street, is Derby 46476 (out of office hours, Derby 44613).

Peat for Generating Electricity

The Scottish Reconstruction Committee of the Peat Development Association states in a memorandum that there are 2,000,000 acres of peat land in Scotland which it is believed can be made of tremendous importance for national development by utilizing them to meet the electricity shortage and future increasing demand for power and for food growing. The Committee is of the opinion that Scotland could take the lead in a new approach to power generation from peat via the gas turbine, and that funds should be made available at once for investigation and research into the possibilities.

Contract Price Adjustment Formulæ

The latest figures for use in connection with the B.E.A.M.A. contract price adjustment formulæ are as follows:—Rate of pay for adult male labour, 13th November: 115s. (unchanged). Board of Trade index figure for intermediate products, 13th November, 250·5, being the figure for October (against 250·0 for September).

Renfrew Workshops Scheme

Clyde Navigation Trustees are to improve the lighting and power installations at the Renfrew workshops at an estimated cost of £33,000, the work to be spread over about three years.

Dissolution of Partnership

Messrs. C. G. G. Hyde and J. Mathers, carrying on business as radio and electrical equipment dealers at 92, Welch Gate, Bewdley, and at workshops at 336, Londonderry Road, Langley, Oldbury, as Midland Radio Services, have dissolved partnership, so far as concerns

Mr. Hyde who retires from the firm. Mr. Mathers will attend to debts and carry on the business under the same title.

Xenon Gas Arc Lamp

Dr. J. N. Aldington says that the 5,000-W xenon gas arc lamp referred to in his lecture reported in our issue of 5th November (p. 718) was not primarily developed for street lighting, as stated; its more immediate uses lie in the field of photographic and film studio lighting. It is in too early a stage of development for its use in other fields to be predicted with any accuracy.

Trade Publications

Enfield Cables, Ltd., Victoria House, Southampton Row, London, W.C.1.—Two illustrated brochures; EN100 describing the size and scope of the company; and EN102 dealing with the manufacture of paper insulated cables of up to 66 kV and containing a useful appendix of technical information.

Crypton Equipment, Ltd., Bridgwater, Somerset.—Leaflet describing the ATC1224 heavy duty fast charger.

Hackbridge & Hewittic Electric Co., Ltd., Hersham, Walton-on-Thames, Surrey.—Descriptive brochure DB2/1 on power transformers for pole and platform mounting.

Johnson, Matthey & Co., Ltd., 73-83, Hatton Garden, London E.C.1.—Technical brochure No. 2128 on low temperature brazing tungsten carbide tool tips.

Trade Announcements

Brown Brothers, Ltd., announce that Mr. W. L. Rutter, previously manager of their Southampton branch, has been appointed manager of the branch at Victoria Street, Bristol, in succession to Mr. W. J. Stemp. Mr. Stemp has made a good recovery from his recent illness and will be shortly taking up a sales appointment with the company in the Midlands. Mr. A. W. MacDonald has been appointed manager at Southampton in succession to Mr. Rutter, and he is succeeded as assistant manager at Thomson & Brown Brothers, Ltd., Edinburgh, by Mr. E. G. Spearing, sales supervisor at Nottingham.

David Brown & Sons (Huddersfield), Ltd., announce that their Bristol office will in future cover only the south-western counties, its duties in the South Wales area having been transferred to the Birmingham office (Prudential Buildings, Colmore Row. Tel.: Colmore 4288).

Mr. F. W. Graefe has joined the London staff of **Connollys (Blackley), Ltd.,** as an additional representative and will operate from the company's office, 34, Norfolk Street, London, W.C.2.

Barries Electrical Agencies, Ltd., have appointed as additional representatives Mr. W. Richardson, 93, Moorcroft Drive, Levenshulme, Manchester, 19 (Lancashire); Mr. L. W. Nutt, 37, Cromwell Road, Hove (London) and Mr. C. C. Huggins, 37, Wickham Road, Beckenham (London).

High Duty Alloys, Ltd., announces the appointment of Mr. A. J. Caterer as sales representative covering Scotland, Northern Ireland, Northumberland, Cumberland and Durham. Mr. Caterer will operate from the company's area sales office at Winscales, Workington (telephone: Workington 581).

Sciaky Electric Welding Machines, Ltd.—Mr. A. G. Galle, A.M.I.E.E., M.INST.W., has been appointed Midland technical sales representative at the Birmingham office, 13, Navigation Street. Mr. Galle was formerly chief electrical engineer to the British Federal Chain Welding Machine Co., Ltd.

The Edinburgh office of **British Insulated Callender's Cables, Ltd.,** is now at 158 St. James' Square, Edinburgh, 1.

The Holland House Electrical Co., Ltd., has changed its registered address to 221, St. Vincent Street, Glasgow, C.2, where it has also opened showrooms.

Trade Marks

APPLICATIONS have been made for the registration of the following trade marks:—

VARMAX. No. 664,850, Class 9. Electrically-operated measuring apparatus, recording meters, electrically-operated controlling apparatus included in Class 9 for heating installations, checking (supervision) apparatus, indicating apparatus for inspectional control, coil-freed apparatus and calculating machines. TELINDUCT. No. 664,845, Class 11. Installations and apparatus for lighting, heating, cooking, refrigerating, drying, ventilating, etc.—Landis & Gyr A.-G., Gubelstrasse, Zug, Switzerland. Address for service: c/o D. Young & Co., 29, Southampton Buildings, Chancery Lane, London, W.C.2.

MINIPAK. No. B660,795, Class 10. Hearing aids for the deaf and parts thereof included in Class 10.—Allen & Hanburys, Ltd., Three Colts Lane, Bethnal Green, London, E.C.2.

UVITA. No. 661,200, Class 10. Electro-medical apparatus.—Tellux, Ltd., 17-19, Edge Street, London, W.8.

THERMOTAP. No. B664,484, Class 11. Electric immersion heaters for use in connection with motor vehicle radiators.—Electrical & Auto Products (1931), Ltd., also trading as Runbaken Electrical Products, 71-73, Oxford Road, Manchester, 1.

KAYMET. No. 666,104, Class 11. Installations and apparatus for lighting, heating, cooking, refrigerating, drying, refrigerating and ventilating purposes, and parts of and fittings for all such goods, all included in Class 11.—N. Schreiber and S. Schreiber, trading as A. Kahn, 89, London Road, London, S.E.1.

Overseas Electrical Trade

NEW EXPORT RECORD IN OCTOBER

ELECTRICAL goods and machinery to the value of over £9½ million were exported from this country during October, representing an increase of 41 per cent upon the October, 1947, figure and over 420 per cent above the monthly average for 1938.

Increases were recorded for nearly all classes as compared with October, 1947. Although there was a substantial decline in shipments of non-submarine telegraph and telephone cable the cable group as a whole made an advance from £1,506,672 to £2,011,361; exports of paper-insulated cables were doubled. Cables with insulation other than rubber were taken mainly by South Africa (£183,452), India, Pakistan, etc. (£129,141), Australia (£109,136),

Table I.—Electrical Exports and Imports

Class	Exports			Imports		
	Oct., 1948	Oct., 1947	Monthly Av., 1938	Oct., 1948	Oct., 1947	Monthly Av., 1938
	£	£	£	£	£	£
Telegraph and telephone wires and cables (submarine)	68,297	18,862	17,289			
Ditto, not submarine	572,836	344,861	71,803			
Wires and cables, rubber insulated	434,341	564,359	117,533			
Ditto, cotton, silk or artificial silk insulated	56,547	50,969	*	14,479	8,486	31,246
Ditto, enamel, glass or asbestos insulated	39,125	27,558	*			
Ditto, paper insulated	736,806	351,618	103,457			
Ditto, other	103,409	148,445	49,799			
Commercial radio apparatus	140,516	169,624	28,296	54,552	28,445	58,018
Domestic radio apparatus	269,569	357,044	36,755			
Telegraph, telephone and signalling apparatus	1,360,946	521,521	242,716	4,800	4,347	9,243
Other radio, etc., apparatus	378,298	213,683	57,848	*	*	*
Radio valves	141,984	142,639	41,272	9,266	44,133	10,893
Electric carbons, furnace	*	*	*	42,914	41,881	4,054
Ditto, other	*	*	*	3,013	3,837	2,301
Electric lamps, not exceeding 24 V	19,975	12,420	49,440	10,410	4,217	10,265
Discharge lamps	30,028	32,027				
Other lamps	80,860	79,294				
Other lighting apparatus	454,833	331,137	48,565	6,205	5,308	38,662
Primary batteries	74,365	51,060	13,572	*	*	*
Accumulators for motor vehicles	83,549	94,611	16,418	*	*	*
Ditto, traction	8,428					
Ditto, radio	4,648	70,602	12,456	*	*	*
Other portable accumulators	33,144					
All other accumulators	34,785	26,073	19,773	*	*	*
Parts and accessories	38,472	42,766	*	*	*	*
Cooking apparatus and elements	144,945	83,547	16,600	*	*	*
Heating apparatus and elements	71,285	115,236	14,064	*	*	*
Other parts and accessories	37,588	34,242	*	*	*	*
Commercial electrical apparatus	94,257	94,963	15,878	15,004	26,418	32,057
House service meters	185,693	136,070	15,791			
Other electrical instruments	114,817	84,826	9,612			
Electro-medical apparatus (not X-ray)	21,468	14,386	3,038	*	*	*
X-ray apparatus, tubes and parts	112,951	39,730	4,881	17,861	43,073	9,734
Insulating cloth and tape	52,819	34,517	7,038	*	*	*
Other insulating materials	80,141	76,027	12,305	*	*	*
Unclassified goods and apparatus	439,109	324,400	108,085	32,845	27,581	56,529
Generators, up to 200 kW	523,865	152,144	38,071	*	*	*
Ditto, over 200 kW	355,661	161,789	119,079	*	*	*
Ditto, parts	196,466	150,839	*	*	*	*
Motors, railway and tramway	6,553	9,350	15,977			
Ditto, other, up to ¼ h.p.	105,239	44,829	9,001			
Ditto, from ¼ to 1 h.p.	62,825	39,968	2,470	26,043	32,312	26,033
Ditto, from 1 to 250 h.p.	433,946	296,819	96,637			
Ditto, over 250 h.p.	107,633	49,665	20,960			
Ditto, parts	50,475	31,536	*			
Converting machinery	6,335	9,631	101,304			
Transformers, including coils	299,570	280,754				
Rectifiers for power house use	20,466	16,767	3,463			
Motor starting and controlling gear	165,524	143,307	50,866	52,319	67,732	14,455
Switchgear and switchboards (not telegraph or telephone)	475,442	470,763	184,533			
Other electrical machinery	26,036	26,499	15,497			
Vacuum cleaners and parts	160,652	177,338	26,662			
Other electrically operated portable appliances	74,084	26,134	10,394	2,913	3,032	24,627
Total	9,591,006	6,777,249	1,829,198	292,624	335,802	328,117

* Not separately classified.

Argentina (£63,790) and Sweden (£44,061.) South Africa and India, Pakistan, etc., were also the chief purchasers of rubber-insulated types.

Both commercial and industrial radio equipment showed a decline; India and Pakistan took about a fifth of the exports of domestic receivers. On the other hand telegraph and telephone apparatus jumped from £552,000 to £1,361,000 and exports were more than five times the 1938 monthly average. Leading customers were South Africa (£435,281) and India and Pakistan (£198,839.)

Table II.—Distribution of Exports of Electrical Goods and Apparatus

Destination	Oct., 1948	Oct., 1947	Monthly Av., 1938
	£	£	£
Eire	243,071	214,531	37,726
Channel Islands	40,295	61,655	12,177
Malta and Gozo	11,700	7,000	5,873
Cyprus	13,326	13,980	1,373
Palestine	7,879	67,847	8,426
British West Africa	74,203	48,144	12,889
Union of South Africa	1,147,048	697,748	162,584
Southern Rhodesia	90,498	91,969	9,632
British East Africa	110,426	63,753	7,893
India, Pakistan, etc.	663,859	666,178	123,789
British Malaya	207,697	116,312	32,792
Ceylon	77,169	52,025	15,048
Hong Kong	129,868	55,949	12,939
Australia	574,940	283,815	197,366
New Zealand	241,554	257,121	96,225
Canada	39,150	56,707	12,547
British West Indies	86,373	23,828	12,954
Anglo-Egyptian Sudan	19,318	12,978	2,989
Other British Countries	129,657	90,572	11,030
Soviet Union	61,456	111,831	36,781
Finland	32,374	31,763	5,969
Sweden	233,622	133,933	14,948
Norway	115,939	162,427	12,881
Iceland	5,155	7,070	2,796
Denmark	142,026	58,840	18,907
Poland	21,517	25,875	9,702
Netherlands	176,601	86,262	22,010
Belgium	125,712	132,552	11,208
France	59,932	48,023	16,082
Switzerland	26,712	25,243	3,768
Portugal	98,224	65,339	6,512
Spain	62,298	17,629	3,813
Czechoslovakia	21,070	45,626	7,205
Yugoslavia	3,329	12,154	1,475
Greece	33,630	51,875	4,926
Turkey	86,518	48,789	7,684
Dutch East Indies	13,563	28,375	2,692
Dutch West Indies	5,458	3,942	830
Portuguese East Africa	18,190	18,753	6,942
Lebanon	20,795	23,040	*
Egypt	152,250	37,126	13,176
Iraq	95,283	106,255	5,530
Iran	122,625	92,081	16,345
Burma	15,751	31,541	5,337
China	97,533	56,894	4,116
United States of America	18,076	13,606	5,839
Mexico	22,701	14,914	1,466
Colombia	9,187	4,768	845
Venezuela	72,546	39,350	2,936
Chile	22,352	7,813	6,635
Brazil	55,866	16,114	11,164
Uruguay	4,897	17,528	1,790
Argentine Republic	361,706	149,786	45,452
Other Foreign Countries	197,909	79,888	40,270
Total	6,520,834	4,689,117	1,134,284

*Not separately specified in 1938

Accumulator exports were reduced but cooking and heating apparatus exports were slightly higher, with cookers up and heaters down.

Taking electrical goods and apparatus as a whole (£6,520,834 against £4,689,117), South Africa was again by far the most important buyer. The Union's total of £1,147,048 (against £697,748 in October, 1947) was approached at a considerable distance by India and Pakistan (£663,859, against £666,178) and Australia (£574,940, against £283,815.) Eire (£243,071) and New Zealand (£241,554) were next in order; British Malaya purchased goods to the value of 207,697. Argentina (£361,706, against £149,786) was the principal foreign buyer, with Sweden (£233,622, against £133,933) second.

Generator exports, particularly the up-to-200 kW class, were substantially higher largely on account of greater shipments to Russia (£354,219 against £15,986), India and Pakistan (£178,758, against £88,319) and Iraq (£130,301 against £2,004). Although on a smaller scale, Canada's purchases were much increased (£41,647, against £7,564), but South Africa and Australia bought less from us. Motor exports were also well up, noteworthy increases occurring in the cases of Australia (from £24,126 to £106,989) and New Zealand (from £16,145 to £107,708).

Exports of other classes of electrical machinery, switchgear, etc., went principally to India and Pakistan and South Africa. Vacuum cleaner exports were lower, largely because of smaller purchases by Australia and Belgium.

New Swiss Hydro-Electric Stations

THE Société l'Energie de l'Ouest Suisse has decided to develop the hydro-electric potantialities on the Dixence River, a tributary of the Rhone, in the Valais, Switzerland. This entails the construction of a new dam 500 m lower down in the same valley as the existing Val reservoir. The existing dam is 450 m long and 87 m high, and retains 50 million cu m of water. It serves the existing Chandoline plant, where five 30,000-kW 500-r.p.m. turbines at 1,420-m head are installed. These generate 200 million kWh during the six winter months and 50 million kWh during summer. The output will be increased to 260 million kWh and 70 million kWh in 1949 when a barrage has been completed at Cleuson.

The original scheme prepared in 1945 allowed for a 30 million cu m reservoir with seven pumping stations containing a total of 300,000 kW of pumps, which would have consumed 575 million kWh annually. The generating plant would have produced 1,630 million kWh during the winter months and 280 million kWh in summer. The scheme finally selected is designed to generate 1,400 million kWh during the winter months.

NEW BOOKS

A.C. Theory for Intermediate Students. Textbook on Telephony.

Theory and Calculation of Alternating Currents. By B. C. Lee, PH.D., A.M.I.E.E. Pp. 150; figs. 151; index. E. & F. W. Spon, Ltd., 57, Haymarket, London, S.W.1. Price 16s.

Notwithstanding the many books that have been written on a.c. theory, there seems to be room for this new work. The opening chapters form a concise and skilful presentation of the subject on conventional lines. After a useful explanation of vector algebra, the author proceeds to deal with practical applications of basic theory to such problems as unbalanced three-phase loads; complex wave forms; calculations relating to transformer performance and line drop; the solution of network problems by Kirchhoff's laws; Thevenin's theorem and the star-delta and delta-star transformations; and short-circuit calculations. The final chapter is a simple introduction to symmetrical component theory.

The subject-matter is illustrated by a large number of worked numerical examples, largely taken from papers set at London University degree examinations. The mathematics, although sometimes rather formidable in appearance, is really quite simple and it can be read by students familiar with secondary-school algebra and trigonometry and with the elements of the calculus.

The book, considering its limited size, is quite well balanced, but the academic three-voltmeter and three-ammeter methods of power measurement and the vector proof of Blondel's theorem might have been omitted to make space for the more practical subject of three-phase energy and reactive measurements. The chapter on symmetrical components, also, might well have included a proof of the formula for positive and negative sequence component values in terms of line currents. These, however, are minor points; generally Dr. Lee's work can be commended as being ably written, well illustrated and produced, and fully indexed. It should be very useful to intermediate students as a supplement to the larger and more comprehensive textbooks.—G.W.S.

Telephony. (Vol. 1.) By J. Atkinson, A.M.I.E.E. Pp. 513; figs. 694; index. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 35s.

This book, covering general principles and manual exchange systems, is a new edition of the well-known work by Herbert & Proctor. Together with Volume 2, which is in preparation, it is designed to cover Grades I, II and III of the new City and Guilds examination in "Telephone Exchange Systems" and the telephone aspects of "Elementary Telecommunications Practice." It consists of 21 chapters, each terminating a useful set of questions on the preceding matter. Quarto size pages are employed, leaving ample space for the diagrams and both the printing and the reproduction of the diagrams are excellent.

For the student this is a first-class book and, as Mr. C. W. Brown (G.P.O.) says in his foreword, its appearance is a welcome event to all telephone men, constituting as it does a valuable addition to existing literature on the subject.

Three appendices cover the C. & G. syllabuses, useful references and answers to numerical questions. The book does not deal with external plant practice or transmission but these, especially the latter, almost require a volume to themselves.

The author's official position has enabled him to produce a book which is both informative and authoritative.—H.H.H.

Spectroscopy and Combustion Theory. By A. G. Gaydon, D.SC. (Second edition). Pp. 242; figs. 13; index. Chapman & Hall, Ltd., 37, Essex Street, London, W.C.2. Price 25s.

This second edition of Dr. Gaydon's excellent book is indeed most welcome. It embodies the results of work done during the past five years and gives an extensive treatment of both the theoretical and experimental applications of spectroscopy to combustion theory. Much new matter has been added and many of the sections have been entirely rewritten. One addition is in the form of a new chapter on the nitric acid test for atomic oxygen in flames. The book has been written in such a way that each chapter is self-contained and may be read independently. This, coupled with the fact that there is a comprehensive bibliography and index, will make it invaluable as a work of reference.—R.P.

American Electricians' Handbook. By T. Croft. Revised by C. C. Carr (Sixth edition). Pp. 1,773; figs and index. McGraw-Hill Publishing Co., Ltd., Aldwych House, London, W.C.2. Price 36s. in U.K.

This reference book for practical workers contains a wealth of information based on the American National Electrical Code. The present edition has been revised and enlarged to include examples of the latest developments in equipment and practice. Among the additional material is a section on electronics, which, although well written, tries to cover too much ground in a small space. This, however, does not detract from the general utility of the book, the remainder of which is well presented.—R.P.

Books Received

Radar Scanners & Radomes. By W. M. Cady, M. B. Karelitz and L. A. Turner. Pp. 491; figs. & index. McGraw-Hill Publishing Co., Ltd., Price 42s. in U.K.

Electric Lifts. By R. S. Phillips. (Second edition.) Pp. 340; figs. 209; index. Sir Isaac Pitman & Sons, Ltd., Parker Street, Kingsway, London, W.C.2. Price 35s.

FINANCIAL SECTION

Company News
Stock Exchange Activities

Reports and Dividends

Tube Investments, Ltd. — As already announced, the trading profits of subsidiary companies for the year ended 31st July last (after providing £1,126,513 depreciation and increased replacement costs of fixed assets) amounted to £5,042,521. With other income the total was £5,363,713. Taxation absorbs £3,292,194, research and development reserve receives £100,000 and profits retained by subsidiaries attributable to group amount to £710,058. The balance of consolidated profit, including adjustments of £226,614 in respect of previous years, is £1,487,756 (against £1,014,391), and with £407,919 (£328,978) brought in there is £1,895,675 (£1,343,369) available. Allocations are £300,000 to special contingencies reserve and £525,000 to general reserve. Total distribution for the year on the ordinary stock remains at 25 per cent and at the same rate relatively on the liaison ordinary shares, and £518,314 is carried forward.

Following a revaluation, the combined fixed assets at 31st July last are shown in the consolidated balance sheet as £16,837,000 compared with £5,477,000 at 2nd August, 1947, and a surplus of £10,078,510 on the revaluation appears under capital reserves which aggregate £13,842,344. Group current assets have increased from £16,384,781 to £19,156,209.

Falk, Stadelmann & Co., Ltd.—In a statement submitted at the annual meeting last week Mr. Hugo Falk (chairman and managing director) said that sales during the year had shown an appreciable increase which had necessitated the carrying of larger stocks of raw materials and finished goods. So far they had been able to finance this expansion out of their own resources, but it might be necessary to obtain additional capital. In most departments output and sales in the first six months of the current financial year had shown further improvement but some departments, such as the electrical domestic appliance section, had been adversely affected by the heavily increased purchase tax. This was detrimental to the export trade, for without a stable home market no balanced production programme could be operated.

Britannia Electric Lamp Works, Ltd.—The consolidated accounts for the year ended 31st March last show a trading profit of £65,859 (against £51,294 for 1946-47) and a net profit of £29,022 (£16,957). After sundry adjustments the final balance is £28,439 (against £19,457) of which £22,914 is dealt with in the parent company's accounts. A sum of £12,931 is applied to equipment replacement reserve (last year £7,500 to general reserve), the ordinary dividend is maintained at 12½ per cent. and £16,514 (£13,037) is carried forward.

The Plessey Co., Ltd., reports net profits for the year ended 30th June last of £117,971, as compared with £190,126 for 1946-47, the latter figure including £114,157, dividend from subsidiary out of taxation reserve no longer required. Taxation absorbs £53,205 and the final ordinary dividend is 10 per cent, making 20 per cent for the year. The dividend for the previous year was also 20 per cent, but in addition a capital distribution of 5 per cent was made. The balance carried forward is £84,815 (against £72,684 brought in).

Joseph Lucas, Ltd., reports net profits for the year to 31st July of £398,416, as compared with £342,261 for the previous year. It is proposed to pay a final ordinary dividend of 12½ per cent, maintaining the distribution at 17½ per cent for the year.

Marco Refrigerators, Ltd.—Consent of the Capital Issues Committee has been obtained for an issue of 100,000 5½ per cent £1 redeemable cumulative preference shares. For reasons of economy it is intended to make these the subject of a Stock Exchange placing. The money is needed to provide further working capital and for repayment of loans raised for recent acquisitions.

The 1947-8 report shows a profit of £80,572, as compared with £67,052 for 1946-47. The final dividend is 17½ per cent, again making 30 per cent for the year.

The British Aluminium Co., Ltd.—The subscription list for the offer for sale of £1,500,000 3 per cent mortgage debenture stock at £95 per cent, which opened and closed on 17th November, was heavily oversubscribed.

Burco, Ltd., reports a net profit for the year to 30th September last of £42,890, as compared with £50,429 for the preceding year. Reserve receives £19,000, and it is proposed to maintain the dividend at 35 per cent for the year, the balance carried forward being £20,327 (against £20,224 brought in).

The Engineering & Lighting Equipment Co., Ltd., reports a net trading loss to 31st March last of £11,785 (against a loss of £35,396 for the previous year).

Thos. Bolton & Sons, Ltd., are paying an interim dividend of 2½ per cent (same).

Lewis Berger & Sons, Ltd., have declared an unchanged interim dividend of 8 per cent.

H. J. Baldwin & Co., Ltd., are again paying an interim dividend of 10 per cent.

The Telephone Manufacturing Co., Ltd., is maintaining its interim dividend at 2½ per cent.

Enfield Cables, Ltd., is paying an unchanged interim dividend of 3¾ per cent.

New Companies

G. H. Smith (Electrical), Ltd.—Registered 15th November. Capital, £2,000. Manufacturers of and dealers in, and agents for manufacturers of, domestic, household and general electrical and other equipment. Directors: G. H. Smith and Mrs. B. A. Smith (secretary), both of 85, Southcroft Road, Orpington. Regd. office: 21, Wardour Street, W.1.

Brigg Electrical Co., Ltd.—Registered 15th November. Capital, £5,000. W. A. Parkin, Carlton House, Grammar School Road, Brigg, Lincs, is permanent managing director and chairman. Secretary: R. Broome. Regd. office: Cressey Yard, Brigg.

Kenelek, Ltd.—Registered 13th November. Capital, £100. Distributors, manufacturers and repairers of, and dealers in, dynamos, motors, armatures, magnetos, cables, lamps, etc. Directors: W. T. Clegg, E. D. Mundy, W. D. Hopkins, H. R. Kennedy and J. T. Clegg. Regd. office: 167, Holdenhurst Road, Bournemouth.

Lindsay Stuart & Co., Ltd.—Registered 11th November. Capital, £5,000. Electrical engineers and general electrical installation contractors, etc. Directors: H. McConchie, R. Johnson, Mrs. Annie G. Tomlinson and Matilda Cadwallader. Regd. office: 23, Park Row, Leeds, 1.

Winding-Up Order

Laurence Electrical Products, Ltd.—In the Companies Court of the Chancery Division of the High Court on 15th November Mr. Justice Vaisey made an order for the compulsory winding-up of the company.

Bankruptcies

I. R. Meredith, 6, Newton Villas, Porthcawl, Glam., electrical engineer.—First meeting held 23rd November, at Swansea. Public examination, 13th December, at the County Court Office, Wyndham Street, Bridgend.

E. B. Page, residing at 3, Peel Street, Hyde, Cheshire, and carrying on business at 10 and 12, John Street, Hyde, electrical engineer.—Supplemental dividend of 2s. 6½d. in the £, payable 10th December at the Official Receiver's Office, 20, Byrom Street, Manchester.

Liquidation

Isle of Thanet Electric Supply Co., Ltd.—Particulars of claims by 8th December to the liquidator, Mr. C. Collins, 36, Victoria Street, London, S.W.1. All creditors have been or will be paid in full.

New Zealand Market

Position of British Products

IN the course of its report for 1947-48 the United Kingdom Manufacturers' and New Zealand Representatives' Association says that keen demand in New Zealand for all types of industrial electrical equipment continues, with increasing difficulty in obtaining deliveries both from United Kingdom and other countries due to the heavy world demand. Prices continue to harden and this, with long-dated deliveries, has a tendency to cause placing of important orders for plant in America, despite the dollar situation. United Kingdom manufacturers should pay close attention to the risk of losing orders to America because of price and delivery.

There continues to be a steady demand for all types of electrical conductors. Heavy power cable is drawn mostly from United Kingdom sources and is now in fairly good supply. V.i.r. covered wires and cables are also readily available from the United Kingdom, but demand has been limited by accumulation of stocks of smaller sizes due to acute shortage of steel conduit for house wiring, which has forced the demand on to other types of cable not requiring steel conduit. New Zealand manufacture of small plastic-insulated wires and flexibles is responsible for considerable curtailment of import licences, involving prohibition of import for a number of sizes of flexibles.

The domestic section reports little change in conditions. Small import licences were granted during the year for vacuum cleaners, domestic irons, electric toasters and electric kettles and these are now on sale throughout the country. Limited licences were also granted for the importation of refrigerators and washing machines, but the local demand is far in excess of the number permitted into the Dominion. At the date of the report no more licences were available for these goods for the remainder of the period.

Other domestic electrical goods such as fires, etc., are still on the prohibited list. The Association has made many representations but without success as the prohibition is applied as protection for the local industry.

Last year mention was made of the improvement in quality of the New Zealand made article —this is reiterated, and the importance is stressed of United Kingdom manufacturers sending only high-grade products to the market. Price is also a factor which must be given careful consideration.

Electrical equipment, cables, etc., are represented on the Council of the Association by Messrs. W. A. Simpson (chairman), S. Cory-Wright, A. Wyness (president of the Association) and R. B. Bradshaw.

STOCKS and SHARES

ACTIVITY in the Stock Exchange markets is noticeable chiefly in the gilt-edged market, where, in spite of an occasional and extremely modest reaction, the prices keep firm, with a rising tendency. Several substantial new issues, eligible for trustee and other investment, have scored a public success which would seem to be remarkable were it not for the continued abundance of money available for the best-class issues. Preparation for meeting the capital levy, due on 1st January, had some effect when it was first announced by the Government, but the need for providing cash to meet the demand is now no longer an influence.

Scramble for Gilt-Edged

British Aluminium's heavily over-subscribed issue of £1½ million 3 per cent debentures at 95 calls attention to the weight of the demand for stocks in this class, despite the fact that they yield only a shilling or two per cent more than do Government securities. At the issue price, which was reckoned to be below market value, the return of £3 3s. 2d. per cent was exactly the same as that from Old Consols on the day of the prospectus. Fairer comparison—the debenture being finally redeemable by 1988—is with the 3 per cent yield on the long-dated British Transport "threes." Since the disappearance of electricity supply shares, little stock of this character is available in the electrical markets. Few of the equipment manufacturers have much in the way of loan capital. The 4 per cent debentures of English Electric and Electric Construction come on offer occasionally at about 104. The new British Aluminium debenture commands a premium of 12s. 6d. The £1 shares are 1s. up, at 49s., on the success of the debenture issue.

Movements in Prices

Rises again outnumber falls in the prices of the shares quoted in our monthly lists. Thomas Tilling at 122s. 6d. are 3s. 9d. up and Associated Electrical are 2s. 6d. higher at 78s. 6d. General Electrics at 90s., Radio & Television at 6s. 6d., Westinghouse Brake at 67s. 6d., Lancashire Dynamo at 5¼, and English Electric at 50s., are all better to the extent of $\frac{1}{16}$ or rather more. Other rises include British Insulated Callenders 35s. 6d., Johnson & Phillips, 70s. 6d., Metal Industries, 48s. 6d., Telegraph Construction, 47s., and Brush, 7s. 3d. Tube Investments are quoted ex dividend, at 6½. Calcutta Trams fell 4s. to 27s. 6d. on the loss shown in the recent accounts, and Calcutta Electrics fell 1s. 6d., to 30s. 6d., in sympathy. British Electric Traction deferred at 1935 is 40 points down. Oriental Telephone, 51s. 3d., De la Rue, 36s. 3d., and Crabtree Electric, 43s., are easier on the week. British Electricity "threes" have hardened to 102⅜, and the scrip, £35 paid, to 1⅛ premium. The 3 per cent British Transport is firm at 101½.

Dividends and Reports

Plessey is maintaining its dividend at 20 per cent, excluding, this time, the 5 per cent capital distribution made a year ago. Now 17s., cum dividend, the shares pay £5 17s. 9d. per cent on the money. J. & F. Stone 5s. shares also stand at about 17s. The company is repeating the previous dividend of 40 per cent; profits show a moderate decline. The yield, therefore, is twice as much as that from Plesseys. Marco Refrigerators 5s. shares kept firm at about 15s. 9d., on the good profits statement. The return on the 30 per cent dividend is 9½ per cent. Shares of Engineering & Lighting Equipment, who report a loss on the year's trading, are quoted nominally at 1s. 3d. for the 2s. ordinary and 12s. 6d. for the preference. Dictograph Telephone disclose with the full report that the recent capital issue would have been larger if the Treasury had consented. No difficulty is anticipated in maintaining the dividend at 16 per cent. The company's 2s. shares are quoted at 5s. 6d.

Aberdare Cables

This company ended its financial year last month. An interim dividend of 6 per cent was paid in September. The shares have been a good market lately in anticipation of the annual results. They were marketed in May last at 58s. 6d., closing at 65s. on the opening day. This week, they have risen 2s. to 66s. 6d. On the prospectus forecast that shareholders will receive 15 per cent for the year, the return works out at £4 10s. per cent, which is appreciably higher than that on the older market favourites among cable shares. Aberdare Cables of South Africa, also under Sir George Usher's chairmanship, issued in January its report for the year to June, 1947. Allotments of the new shares recently offered at 10s. 6d. will shortly be in shareholders' hands. The existing 5s. shares are firm at 18s. 6d.

Broadcast Relay Services

This company's interim dividend of 8 per cent, recently declared, coincided with a marked revival of investment interest in the business of broadcast rediffusion. This has been due in part to reports that British Thomson-Houston and E.M.I. are developing their interest in the field. Broadcast Relay is one of the companies in which British Electric Traction has been increasing its investments. During the year ended last March, the continuous growth of profits encouraged the company to raise the interim dividend from 5 to 8 per cent, but dividend limitation intervened before the final, which was cut to keep the total down to 13 per cent; dividends are paid free of tax. After rising, over the past few weeks, from 21s. 6d. to 24s., the shares yield just under 5 per cent gross. An early Government statement is hoped for on the subject of the Post Office's right to take over the system, on a valuation basis, at the end of the year.

MOTORS
GENERATORS

CONTROL GEAR
AIR BREAK
OIL IMMERSED
HAND OPERATED
AUTOMATIC

SWITCHGEAR
SWITCHES
FUSES
SWITCHBOARDS
AIR BREAK
OIL IMMERSED

FANS
CEILING
DESK and
BRACKET
VENTILATING

LIGHTING FITTINGS
suitable for FILAMENT,
GAS-DISCHARGE, and
FLUORESCENT LAMPS

OF IMPORTANCE TO YOU

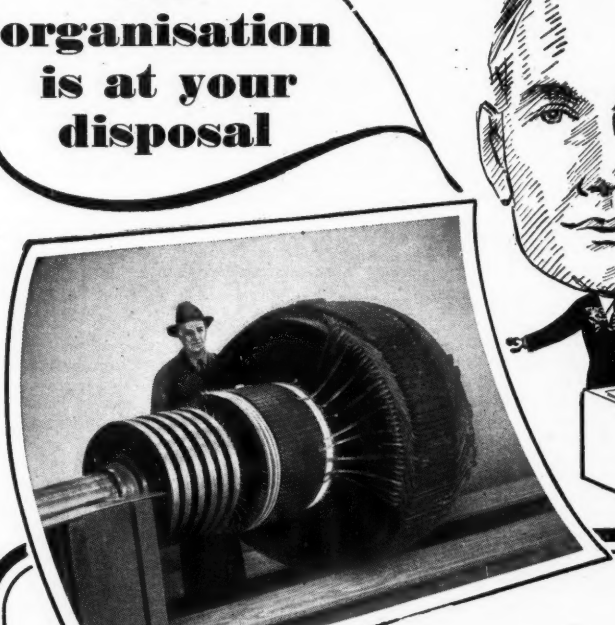
In order that we may give you the best service under the present difficult conditions we appeal to you to utilise standard equipment, ratings, etc., whenever possible. Your co-operation in this respect will enable us to concentrate on standard production with consequent reduction in despatch time.

USE "STANDARD"

VERITYS Ltd.

Sales Headquarters : **BRETTENHAM HOUSE, LANCASTER PLACE, W.C.2**
Works : ASTON, BIRMINGHAM 6

Our organisation is at your disposal



BURDETTE & CO. LTD.

Electrical, Mechanical Engineers and Contractors

Tel. : MACaulay 4555 (5 *lines*)

Head Office : 150 Clapham Manor Street, London, S.W.4

Main Works : Stonhouse St., S.W.4

Branch Works : Blackfriars, S.E.1

Radington Works, S.W.4

Bramwell Street, S.W.17

Established over 40 years

Breakdown Service always available

We have pleasure in offering our organisation as specialists for Electrical Installations, Repairs and Maintenance of all types of Electrical Equipment. In this category our capacity is unlimited. New and Second-hand Motors in Stock.

BURDETTES
Electrical Services

Electricity Supply

Tummel-Garry Contracts. Asiatic Reconstruction Plan.

Aysgarth (Yorks).—OVERHEAD LINES.—The Rural District Council has approved plans by the North-Eastern Electricity Board for extending overhead lines to supply Upper Wensleydale.

Bolton.—STREET LIGHTING.—The Corporation has accepted the estimates of the borough engineer for the installation of street lighting on the Breightmet Hall, Eastfield, Blenheim Road, Entwistle Street and Eldon Street estates.

Coalville (Leics.)—STREET-LIGHTING CONVERSION.—Approximately 200 mercury vapour lamps will replace gas lamps in the centre of the town.

Dunston-on-Tyne. — REPAIRS TO DAMAGED PLANT.—The generating plant put out of commission by fire at the power station some weeks ago is expected to be in operation again by the end of January.

Northern Ireland.—NEW POWER STATIONS PROPOSED.—The Northern Ireland Electricity Board is investigating the possibility of erecting three additional hydro-electric stations with a capacity of 24,000 kW.

Scotland. — TUMMEL-GARRY SCHEME. — On Saturday Mr. Herbert Morrison, Lord President of the Council, accompanied by Mr. Thomas Johnston, chairman of the North of Scotland Hydro-Electric Board, visited the Tummel-Garry Scheme at Pitlochry (Perth) and saw the considerable progress which is being made on the Pitlochry-Clunie Dam. He also visited Faskally House, which is shortly to be opened as a staff college for the Board's technicians. Mr. Morrison was told that it was expected that the electricity from the Clunie station would be available at the end of next year.

The contract for the civil engineering work on the Errochty section of the Tummel-Garry project (Constructional Scheme No. 2) has been placed with A. M. Carmichael, Ltd., Edinburgh. This section will utilize 86 sq miles of catchment area comprising the upper waters of the Rivers Bruar, Garry and Errochty. The contract includes the construction of twelve miles of collecting tunnels and aqueducts bringing water into a new reservoir, three miles long, on the upper Errochty. The dam creating this new loch will be 1,310 ft long and 127 ft high. A tunnel over five miles long will lead straight to the power station on Loch Tummel without any external pipeline. The generating station itself will be mainly, if not entirely, underground. The plant will consist of three 25,000-kW vertical shaft Francis turbo-alternators of Boving design which will be built by John Brown & Co., Clydebank. The alternators will be supplied by the General Electric Co., Ltd., and the main transformers by Bruce Peebles & Co., Ltd., Edinburgh. Sir Alexander Gibb & Partners are the civil engineering consultants, Merz & McLellan being the electrical and mechanical consultants.

St. Helens.—NEW POWER STATION.—Officials of the British Electricity Authority visited St. Helens on 18th November to discuss with Corporation officials details of the new Bold power station. They were entertained to lunch by the Mayor.

West Hartlepool.—STREET LIGHTING IMPROVEMENTS.—Improvements are to be made to street lighting by the Town Council. Sodium vapour lighting is to be installed along main roads.

Overseas

Asia.—FIVE-YEAR PLAN. A five-year "master plan" for the reconstruction of Asia—a counterpart to the European Recovery Programme—has been drawn up by the Industrial Working Party of the Economic Commission for Asia and the Far East (ECAFE). It calls for a total outlay of $13,600 million. The programme covers the expenditure of $1,820 million for electric power—largely hydro-electric developments—and "represents a sizeable beginning towards the use of the water power resources in Asia." Many of these hydro-electric works are planned as an integral part of the complete development of water basins, including also irrigation, navigation and flood control. This expansion would represent an increase in capacity from 4 million kW at present to 6·4 million kW in roughly five years and to 10·3 million kW in a longer term.—*Reuter* (Shanghai).

Madeira. — HYDRO-ELECTRIC SCHEME. — The Comissao Administrativa dos Aproveitamentos Hidraulicos de Madeira, Funchal, Madeira, has invited tenders for the carrying out of a large-scale hydro-electric power scheme, including the harnessing of water power in Madeira, the erection of substations and construction of transmission lines and cables to Funchal. No closing date for tenders has been announced yet but details can be obtained from the Commission. It is believed that the scheme will cost between 50 million to 75 million escudos.—*Reuter* (Lisbon).

Malaya.—PLANS FOR TWO POWER STATIONS. —It is reported from Kuala Lumpur that financial approval is awaited for preliminary work on two hydro-electric power stations at Cameron Highlands to cost $89,000,000. With other power stations, they would serve a grid system covering the whole of the west coast from Perlis to Muar. The scheme would be completed in ten years in two five-year stages.

Next Week's Events

Monday, 29th November

BIRMINGHAM.—James Watt Memorial Institute, 6 p.m. I.E.E. South Midland Radio Group. "Industrial Electronics Laboratories," by G. A. Hickling.

NEWCASTLE-ON-TYNE.—King's College, 6.15 p.m. I.E.E. North-Eastern Radio and Measurements Group. "Survey of Metering Practice on the British Grid System," by F. Byrne.

Tuesday, 30th November

LEEDS.—Yorkshire Electricity Board Offices, 1, Whitehall Road, 6.30 p.m. I.E.E. North Midland Centre. "Load Dispatching and the Reasons for it, with special reference to the British Grid System," by A. R. Cooper.

LOUGHBOROUGH.—The College, 6.30 p.m. I.E.E. East Midland Centre. "Waterworks Power Plant Practice: the Comparative Costs of Steam, Diesel and Electrically Operated Plant," by T. P. Wakeford.

Wednesday, 1st December

CRUMLIN.—School of Mines, 6 p.m. Association of Mining Electrical and Mechanical Engineers (South Wales Branch). "Mines Electrical Report," by C. M. Harvey.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. I.E.E. Radio Section. "Fixed Resistors for Use in Communication Equipment with special reference to 'High Stability' Resistors," by P. R. Coursey.

I.E.E. London Students' Section, 2.30 p.m. Visit to Sperry Gyroscope Co., Ltd., Brentford.

MIDDLESBROUGH.—Cleveland Scientific and Technical Institute, 6.30 p.m. I.E.E. Tees-Side Sub-Centre. "Waterworks Power Plant Practice: the Comparative Costs of Steam, Diesel and Electrically Operated Plant," by T. P. Wakeford.

ROMFORD.—Mawneys Arms, 8 p.m. A.S.E.E. North East London Branch. "Colour Vision," by H. W. Windebank.

RUGBY.—Electricity Showrooms, 6.30 p.m. I.E.E. Rugby Sub-Centre. "The Design of Large Vertical-Shaft Water-Turbine-Driven A.C. Generators," by E. M. Johnson and C. P. Holder.

SOUTHAMPTON.—University College, 6.30 p.m. I.E.E. Southern Centre. "Behaviour of High-Voltage Solid-Type Cable Accessories in Service," by C. J. Armstrong and C. T. W. Sutton.

YORK.—Royal Station Hotel, 7.30 p.m. A.S.E.E. York Branch. "Industrial Lighting," by C. C. Veitch.

Thursday, 2nd December

CROYDON.—Café Royal, 8 p.m. A.S.E.E. South London Branch. "Problems of Installation in Blocks of Flats," by A. A. Cheyne.

LONDON.—Savoy Place, W.C.2, 5.30 p.m. Institution of Electrical Engineers. "Magnetic Amplifiers," by A. G. Milnes, and "The Theory and Design of Magnetic Amplifiers," by H. M. Gale and P. D. Atkinson. (Measurement Section papers.)

MANCHESTER. — Engineers' Club, Albert Square. 7 p.m. E.P.E.A. Northern Meter and Instrument Technical Group. "The Work of the Industrial Engineer," by L. O. Deacon.

PONTYPRIDD.—The New Inn Hotel, 6 p.m. Association of Mining Electrical and Mechanical Engineers (South Wales Branch). "Mines Electrical Report," by C. M. Harvey.

WORCESTER. — Talbot Hotel, 7.15 p.m. Worcester Electric Club. "Applications of Refrigeration, Common and Uncommon," by F. F. Briginshaw.

Friday, 3rd December

BIRMINGHAM.—Imperial Hotel, Temple Street, 6 p.m. Illuminating Engineering Society (Birmingham Centre). Joint meeting with A.S.E.E. and E.C.A. "Maintenance of Fluorescent Lamps and Auxiliary Gear," by W. A. R. Stoyle.

CARDIFF.—At the South Wales Institute of Engineers, Park Place, 6.30 p.m. Association of Supervising Electrical Engineers. "The Supervising Engineer in Industry," by A. G. Ramsey (president).

LONDON.—Chelsea Town Hall, S.W.3. Joint dance of the London Students' Sections of the I.E.E., Inst.C.E., and I.Mech.E.

Fleming's Restaurant, Oxford Street, W.1, 6 for 6.30 p.m. Electrical Trades Commercial Travellers' Association. Dinner and smoking concert.

At the Royal Society of Arts, John Adam Street, Adelphi, W.C.2, 7 p.m. Institution of Electronics. "Some Developments in Picture Telegraphy," by J. Bell.

MANCHESTER.—Engineers' Club, Albert Square, 6.45 p.m. Manchester Association of Engineers. "The Gas Turbine for Industrial Power," by R. G. Voysey.

Saturday, 4th December

LEEDS.—Association of Mining Electrical and Mechanical Engineers (Yorkshire North-West Branch). Discussion meeting.

Information Department

THE extensive records of our Information Department enable us to reply to most queries, but occasionally we ask for our readers' assistance in tracing names and addresses not known to us. We should be glad to have such information regarding the makers of the following:—

"Poynt" change-over switches.

General inquiries from readers relating to sources of electrical goods, makers' addresses, etc., are replied to by our Information Department through the post. Inquiries should be accompanied by a stamped addressed envelope.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (2s. each) may be obtained from the Patent Office, 25, Southampton Buildings, London, W.C.2.

1943

British Thomson-Houston Co., Ltd.—" Electronic valve circuits for interchanging power between alternating and direct current circuits." 19497. 23rd November, 1942. (611707.)

1944

Thompson Products, Inc.—" Methods of electropolishing and the hollow stem valves having an electropolished internal surface " and " Methods of and apparatus for electrolytically cleaning or descaling the internal surface of a hollow metal article, such as the internal surface of a hollow metal valve." 4720/1. 9th April, 1943. (611609/10.)

E. P. Newton (Telefonaktiebolaget L. M. Ericsson).—" Telephone instruments." 9296. 15th May, 1944. (612005.)

British Thomson-Houston Co., Ltd.—" Electric transmission lines and applications thereof." 13871. 19th July, 1943. (611611.)

S. F. Warren.—" Radio-frequency heating particularly for the permanent waving of hair." 19444. 10th October, 1944. (611710.)

Philco Radio & Television Corporation.—" Refrigerator door latch." 25899. 24th December, 1943. (611711.)

1945

Standard Telephones & Cables, Ltd.—" Shielded connector arrangement for cathode leads of electron-discharge devices." 559. 31st January, 1944. (611712.)

Marconi's Wireless Telegraph Co., Ltd.—" Television transmitters." 1544. 13th May, 1943. (611713.)

Landis & Gyr Soc. Anon.—" Electrical system of remote control." 2424. 15th February, 1944. (611714.)

F. Watson (Aktiebolaget Elektrolux).—" Dynamo-electric machines." 4982. 28th February, 1945. (611715.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—" Television apparatus." 9239. 13th April, 1945. (612007.)

British N.S.F. Co., Ltd., K. G. Smith, and L. G. Newman.—" Electrical components having associated insulating sealing material." 19159. 26th July, 1945. (611719.)

P. D. Bernard.—" Electronic valve apparatus for electrotherapy." 19521. 30th July, 1945. (611618.)

Farnsworth Television & Radio Corporation.—" Multivibrator circuits." 21396. 26th August, 1944. (611722.)

F. B. Dehn (Adel Precision Products Corporation).—" Conduit grounding and supporting clip." 21803. 24th August, 1945. (611723.)

Marconi's Wireless Telegraph Co., Ltd.—" Electron-discharge device." 22802. 14th December, 1943. (611912.)

Marconi's Wireless Telegraph Co., Ltd.—" Pulse communication system." 25767. 17th February, 1944. (611727.)

General Electric Co., Ltd., E. P. Fairbairn, and A. A. Chubb.—" Variable-frequency radio signalling apparatus." 28959. 31st October, 1945. (611728.)

Marconi's Wireless Telegraph Co., Ltd., and S. Aisenstien.—" Magnetron anodes." 30527. 14th November, 1945. (611732.)

Soc. Anon. pour les Applications de l'Electricité et des Gaz Rares, Etablissements Claude-Paz et Silva.—" Electrode system for negative glow discharge lamps." 33204. 24th April, 1945. (611737.)

B. S. Smith, E. W. Pratt, and C. S. Wright.—" Piezo-electric crystal vibrators." 34416. 19th December, 1945. (611738.)

1946

H. O. Ross.—" Electronic shields." 562. 15th October, 1945. (611742.)

Det Norske Aktieselskab for Electrokemisk Industri.—" Turntables, for example for supporting electric furnaces." 5815. 15th April, 1944. (611925.)

Soc. d'Exploitation de Brevets.—" Automatic regulation of electric commutator machines." 6864. 8th March, 1945. (612016.)

S. Bouffe.—" Electric kitchen ranges." 7027. 23rd February, 1945. (611746.)

British Thomson-Houston Co., Ltd.—" Magnetrons." 7247. 13th November, 1942. (612017.)

British Vacuum Cleaner & Engineering Co., Ltd., and H. O. Hamilton.—" Time setting devices for alarm and like clocks." 8490. 19th March, 1946. (Cognate application 14062/46.) (611631.)

Philips Lamps, Ltd.—" Method of manufacturing indirectly heated cathodes." 9421. 15th October, 1941. (611933.)

International Business Machines Corporation.—" Electronic commutators or the like." 10169. 10th April, 1945. (611749.)

E. L. C. White, and E. A. Newman.—" Circuits for generating electrical impulses." 12145. 20th April, 1946. (611751.)

Metropolitan-Vickers Electrical Co., Ltd., and J. B. Hansell.—" Electric transformers and reactors." 12859. 29th April, 1946. (Addition to 503,041.) (611638.)

Cinema-Television, Ltd., G. E. G. Graham and M. Morgan.—" Relaying systems for telephony, television, facsimile and like methods of trahsmitting intelligence." 13053. 30th April, 1946. (611639.)

British Insulated Callender's Cables, Ltd., J. C. Quayle, and P. Jones.—" Apparatus for heating insulating material by subjecting it to a high-frequency field of electric force." 13408. 2nd May, 1946. (611645.)

Soc. Francaise Radio Electrique.—" Manufacture of the envelopes of electron-discharge and other evacuated devices." 13423. 14th May, 1945. (611649.)

British Thomson-Houston Co., Ltd.—" Protective arrangements in polyphase electric networks." 13462. 7th May, 1942. (611656.)

Standard Telephones & Cables, Ltd.—" High-frequency signalling system " and " Electric resonators for ultra-high frequencies." 13522/3. 22nd February, 1944. (611666/7.)

V. Hartley.—" Illuminating means for use with billiard tables and the like." 13590. 4th May, 1946. (611673.)

General Electric Co., Ltd., English Electric Co., Ltd., and G. J. H. Bignell.—" Fusible electric cut-outs." 13662. 6th May, 1946. (611684.)

Westinghouse Electric International Co.—" Small automatic electric circuit-breakers." 13669. 7th May, 1945. (611686.)

Philips Lamps, Ltd.—" Electric incandescent lamps." 13674. 3rd February, 1942. (611687.) " Thermionic-discharge devices." 13676. 5th February, 1942. (611688.)

British Thomson-Houston Co., Ltd.—" Valves." 13693. 7th May, 1945. (611691.)

British Vacuum Cleaner & Engineering Co., Ltd., M. Johnston, and W. T. Curry.—" Apparatus for making hot beverages." 13715. 6th May, 1946. (611696.)

A. R. J. Ramsey (Guardian Electric Manufacturing Co.).—" Electromagnetic relay." 13716/7. 6th May, 1946. (611697/8.)

E. J. Howlett.—" Laundry and like presses." 13722. 6th May, 1946. (Addition to 583516.) (611755.)

Parsons & Marine Engineering Turbine Research & Development Association, T. W. F. Brown, and H. G. Yates.—" Gas turbines and the like." 13776. 7th May, 1946. (611763.)

Parsons & Marine Engineering Turbine & Research Development Association, and T. W. F. Brown.—" Gas turbines." 13815. 7th May, 1946. (611768.)

Laurence, Scott & Electromotors, Ltd., F. B. Young, L. Champney, W. Burnside, J. M. Platt and F. A. Shorten.—" Apparatus for indicating the position or course of a navigable vehicle." 13827. 7th May, 1946. (611770.)

T. Latham.—" Electric lamp locking device." 13847. 8th May, 1946. (611772.)

A. Reyrolle & Co., Ltd., and N. R. Blanch.—" Gas-blast electric circuit-breakers." 13869. 8th May, 1946. (611775.)

South Wales Switchgear, Ltd., and A. G. Mather.—"Thermal device for effecting electrical switching operations." 13910. 8th May, 1946. (611781.)

C. B. Backer.—"Tubular electric heating element and method of making the same." 13915. 12th May, 1945. (611785.)

Holophane, Ltd. (Soc. Anon. Holophane).—"Mounting of electric lamp fittings." 13933. 8th May, 1946. (611789.)

F. L. Broussouse.—"Magnetic braking devices for electric induction motors." 13948. 17th September, 1945. (611809.)

D. S. Schreiber.—"Control systems for discharge lamps." 13950. 8th May, 1945. (611793.)

General Electric Co., Ltd., and C. R. Dunham.—"Control of alternating-currents in parallel-connected load-circuits." 13959. 8th May, 1946. (611810.)

H. F. P. Caton, and G. N. Pritty.—"Electric fires." 13999. 9th May, 1946. (611798.)

Naamlooze Vennootschap Philips' Gloeilampenfabrieken.—"Electric contact device such as an electric vibrator." 14025. 81th March, 1942. (611814.)

Philips Lamps, Ltd.—"Devices comprising a cathode-ray oscillograph." 14026. 9th February, 1942. (611815.) "Switch devices comprising an auxiliary relay and a principal relay." 14027. 18th February, 1942. (611816.)

Westinghouse Electric International Co.—"Trip means for electric circuit-breakers." 14036. 9th May, 1945. (611817.)

Dubilier Condenser Co. (1925), Ltd.—"Apparatus for electrically treating fluids." 14044. 12th February, 1946. (Addition to 601579.) (611819.)

Armour Research Foundation.—"Permanent magnet material." 14149. 13th August, 1945. (611836.)

York Shipley, Ltd. (York Corporation).—"Food freezing apparatus." 14159. 10th May, 1946. (611840.)

General Electric Co., Ltd., L. C. Stenning, and A. J. Bayliss.—"Muting devices for signal receivers." 14167. 10th May, 1946. (611841.)

British Thomson-Houston Co., Ltd., and A. N. Appleyard.—"Coil clamping devices for electrical apparatus such as transformers." 14175. 10th May, 1946. (611845.)

Johnson, Matthey & Co., Ltd., and E. J. Wyeth.—"Casings for electrical condensers, resistors and the like." 14187. 10th May, 1946. (611850.)

Standard Telephones & Cables, Ltd.—"Rotary condensers." 14201. 31st March, 1943. (611854.)

Marconi's Wireless Telegraph Co., Ltd., and E. Greene.—"Electrical networks for use on alternating currents." 14219. 10th May, 1946. (611858.)

H. Frost & Co., Ltd., and A. E. B. Perrigo.—"Means for closing the winding slots of dynamo-electric machines." 14256. 11th May, 1946. (611867.)

Record Electrical Co., Ltd., and S. J. Wimsett.—"Earth leakage devices for electrical apparatus." 14295. 11th May, 1946. (Addition to 580787.) (611871.)

H. Jackson.—"Electro-magnetic clamps, vices, and the like." 14319. 11th May, 1946. (611873.)

Ferranti, Ltd., and F. L. Humber.—"Electric resistance heating elements." 14331. 13th May, 1946. (611874.)

W. M. Henderson.—"Electric cable supporting device for use with a laundry electric hand iron." 14346. 13th May, 1946. (611878.)

Radiation, Ltd., and W. R. Twigg.—"Mounting of gas or electric fires or other heating apparatus." 14359. 13th May, 1946. (Cognate application 32938/46.) (611883.)

British Thomson-Houston Co., Ltd.—"Methods of treating electrical coils." 14411. 14th May, 1945. (611894.)

Dubilier Condenser Co. (1925), Ltd., P. R. Coursey, C. H. Munday and K. A. Gough.—"Electrical condensers." 14428. 13th May, 1946. (Cognate Applications 36201/46 and 36202/46.) (611900.)

Marconi's Wireless Telegraph Co., Ltd.—"Microwave and similar electrical resonant or reactive apparatus." 14447. 8th November, 1944. (611938.)

Pye, Ltd., D. Jackson, and T. A. Butler.—"Electric plug contacts." 13th May, 1946. (611943.) "Apparatus for radio-frequency heating." 14464. 13th May, 1946. (611944.)

H. A. Smith—"Magnetic spinning-top." 14485. 14th May, 1946. (611947.)

C. R. Segrave, T. B. Glynne-Williams and H. H. Barker.—"Means for controlling electrical circuits by fluid-pressure." 14506. 14th May, 1946. (611950.)

W. W. Constantine (General Motors Corporation).—"Thermostatic electric switch for oven control." 14511. 14th May, 1946. (611951.)

Armour Research Foundation.—"Magnetic recording and reproducing head." 14516. 29th November, 1945. (611952.)

Westinghouse Electric International Co.—"Manufacture of electrical induction apparatus." 14529. 19th April, 1945. (611953.)

F. R. Williams and P. H. Davies.—"Thermostatically controlled electric irons." 14602. 14th May, 1946. (Addition to 587197.) (611967.)

Concrete Utilities, Ltd., and C. A. Marques.—"Lamp standards." 14614. 15th May, 1946. (611970.)

R. H. Colborne.—"Securing of insulating terminal caps to the envelopes of electron discharge devices." 14617. 15th May, 1946. (611971.)

V. W. Oakes.—"Thermal starting switches for electric-discharge tubes." 14639. 15th May, 1946. (611974.)

General Electric Co., Ltd., and D. C. Espley.—"Optical systems for television and like purposes." 14684. 15th May, 1946. (612025.)

British Thomson-Houston Co., Ltd.—"Mechanical damping devices." 14693. 16th May, 1945. (612026.)

Metropolitan-Vickers Electrical Co., Ltd., and J. B. Hansell.—"Electrical earthing reactors." 14819. 16th May, 1946. (611977.)

Sir H. Ingram.—"Electric heaters." 14843. 16th May, 1946. (612052.)

W. T. Glover & Co., Ltd., E. L. Davey, and F. R. Credland.—"Manufacture of electric cable joints and terminations." 14869. 16th May, 1946. (612059.)

G. Scarpa.—"Insulators for high-tension transformers." 14881. 16th November, 1945. (612061.)

Standard Telephones & Cables, Ltd., I. I. Boswell, and F. E. Planer.—"Electric two-way communication systems." 16246. 28th May, 1946. (611986.)

British Thomson-Houston Co., Ltd., and J. A. Stokes.—"Electrical remote control systems." 17097. 5th June, 1946. (611992.)

Baxter Bros. & Co., Ltd., and W. Ogilvy.—"Electrical warp stop-motions for looms." 18522. 20th June, 1946. (612072.)

Fairey Aviation Co., Ltd., E. C. Garrard and F. L. Ebel.—"Electric motors having wound stators and unwound rotors." 20348. 8th July, 1946. (612080.)

Philips Lamps, Ltd.—"Electric-discharge tubes comprising luminescent material." 24615. 16th November, 1942. (612085.)

Burndept, Ltd., R. P. Richardson and R. W. Lewis.—"Primary electric cells." 27177. 10th September, 1946. (612086.)

J. W. Gibson.—"Wiring systems for electrical installations." 28005. 18th September, 1946. (612091.)

British Thomson-Houston Co., Ltd.—"Electric lamps." 30675. 17th October, 1945. (612099.)

Metropolitan-Vickers Electrical Co., Ltd., J. Fowler, and E. Coad.—"Electric transformers." 30823. 16th October, 1946. (612100.)

Proctor Electric Co.—"Flat iron support." 31453. 4th December, 1945. (612102.)

Electricity and the Cinema

At a meeting of the Tees-side Group of the Illuminating Engineering Society on 17th November, the chairman, Mr. N. Hunter, senior executive officer, Stockton-on-Tees Unit, North-Eastern Electricity Board, read a paper on "Electricity and the Cinematograph." Mr. Hunter reviewed the history of the development of the cinema and proceeded to deal with the principles of projection and the production of the sound track and the mechanism of the projector and its auxiliaries was then covered, particular reference being made to the illuminants employed—arc lamps and tungsten and discharge lamps. The paper concluded with some notes on sub-standard films.

CONTRACT INFORMATION

ACCEPTED TENDERS AND PROSPECTIVE ELECTRICAL WORK

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Argentina.—BUENOS AIRES.—11th January. Directorate-General of Water and Electric Power. Two water turbines coupled to alternators, switchboard, and internal service electrical installation for Salto de La Loma hydro-electric power station. (E.P.D. 43014/48. Com./1408.)*.

Belfast.—10th December. Electricity Department. Electric hoist-blocks and jib-crane for Harbour power station. (See this issue.)

Brazil.—RIO DE JANEIRO.—4th to 13th January. Rio Grande do Sul Commission for Electric Power. Equipment for extension to Passo Fundo hydro-electric power station, including Francis water turbine, alternator, transformers, transformer substations and auxiliary services. (E.P.D. 43076/48. Com./1407.)*

Lanark.—County Council. About 300 140-W sodium discharge lamps. Particulars from the county lighting engineer, 15, Clydesdale Street, Hamilton.

Poplar.—9th December. Borough Council. Electric lamps. (See this issue.)

South Africa. — JOHANNESBURG. — 3rd February. South African Railways and Harbours. Telegraph line material (Tender No. 8199). Particulars from the chief stores superintendent, S.A.R., Park Chambers, Rissik Street.

10th February (date extended). Diesel-electric shunting locomotive (Tender No. 7523).

17th December. City Council. Insulating sheets for switchboard panels. (E.P.D. 43190/48. Com./1429.)*

PRETORIA.—30th December. South African Government Irrigation Department. Electrically driven centrifugal pump with starting equipment (Tender No. 300) and electrically-driven borehole pumping plant (Tender No. 361). Tender forms from the Controller of Stores, Irrigation Department, P.O. Box 277.

* Specifications may be inspected at the Export Promotion Department, Thames House North, Millbank, S.W.1.

Orders Placed

Durham. — County Council. Accepted. Electrical installation at Elvet Station which is being used as offices (£420).—North of England Engineering & Electrical Co.

Liverpool.—CORPORATION BATHS COMMITTEE. Accepted. Fluorescent lighting fittings in the Harold Davis and William Roberts Baths (£590).—B.T.H. Co.

London.—County Council. Accepted. School electrical installations:—St. George-in-the-East, Whitechapel.—Thorpe & Thorpe. Surrey Square, Southwark.—Holliday & Son (Elecl.). Endfield Road, Hackney.—George E. Taylor & Co. (London). Two passenger lifts and electric coal hoist, Tanners Hill Estate, Stepney.—Express Lift Co.

Middlesbrough.—Town Council. Accepted. Private automatic telephone system for the Town Clerk's and Borough Engineer's Departments.—Reliance Telephone Co. Improving the lighting in the Borough Engineer's Department drawing office.—North Eastern Electricity Board.

Newcastle-on-Tyne.—City Council. Accepted. Street lighting standards and brackets (£1,751).—Revo Electric Co. Street lighting lanterns and control equipment (£1,181).—G.E.C. Switches for controlling the rectifier and street lighting transformer at the Raby Street sub-station (£585).—A. Reyrolle & Co.

West Hartlepool.—Town Council. Accepted. Sodium lanterns (£629).—Metrovick.

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Amble.—Factory premises; Hardy & Co., Alnwick.

Arbroath.—Houses (62), Royal Naval Air Station; Scottish Orlit Co., Ltd., 79, George Street, Edinburgh, 2.

Aycliffe.—New factory; Bakelite, Ltd., 18, Grosvenor Gardens, S.W.1.

Banstead.—Permanent houses (50), Preston Lane, Tadworth; F. H. Wiltshire, clerk to U.D.C., The Council House, Brighton Road.

Barnsley.—Factory, Laithes Lane; W. Freeman & Co., Ltd., Subaseal Works, Peel Street.

Bathgate.—Combined church and hall at Livingstone Station (£11,200); clerk to Bathgate Presbytery.

Bedfordshire.—Secondary grammar-technical school, Biggleswade, and county primary schools at Dunstable, Totternhoe and Caddington; county architect, Shire Hall, Bedford.

Bideford.—Model milk bottling factory, Kingsley Road; Bideford Dairies, Ltd., Clovelly Road.

Bilston.—Flats in two blocks, Ward Street, Ettingshall; McKewan, Fillmore & McKewan, architects, 8, Newhall Street, Birmingham.

Birmingham.—Maternity hospital and nurses' home, Perry Barr; city engineer.

Bradford.—Houses (100) Buttershaw estate; city architect.

Bristol.—Schools at Novers Lane, Lockleaze and Petherton Road; city architect, Eagle House, Colston Avenue.

Burnley.—Ophthalmic operating theatre, Victoria Hospital, and kitchen equipment for Primrose Bank Institution; Manchester Regional Hospital Board, Sunlight House, Quay Street, Manchester.

Cambridge.—New wing to St. Catherine's College; G. L. Kennedy, architect, 46, Oakley Street, S.W.3.

Cardiff.—Factory, Mardy Industrial Estate; Meredith & Drew, Ltd., 351, Highway, London, E.1.

Droylsden.—Girls' secondary school, Manor Road (£206,564); Wm. Townson & Sons, Ltd., builders, Park Hill Street, Bolton.

Dunfermline.—Ante-natal clinic at Maternity Hospital (£20,000); W. Muir, secretary, West Fife Hospitals Group Board of Management, Dunfermline.

Dunstable.—Flats, Beecroft estate; borough engineer.

Eastbourne.—Houses (110), Davis-Chatfield estate; borough engineer.

Glasgow.—New building for Royal Technical College; C. Sinclair, architect, 121, West Regent Street.

Gosport.—Fire station, Bury Cross; borough engineer.

Grangemouth.—New factory (£4,000,000) for British Petroleum Chemicals, Ltd., London (plans approved at Dean of Guild Court); secretary of the company, London.

Heywood. — Day nursery, Queen Street (£11,000); G. Noel Hill, county architect, Preston.

Ipswich.—Office block, Rope Walk, for East Suffolk C.C.; E. J. Simcox, county architect.

Kingston-on-Thames. — Workshop block at Technical College (£87,000); Lavender, McMillan, Ltd., builders, Worcester Park.

Knutsford.—Extensions to Kilrie Children's Home (£20,000); Cheshire county architect, Chester.

Lindsey.—Eight county colleges (£839,000); county architect, County Offices, Newland, Lincoln.

Liverpool.—Two transit sheds at docks and one at Birkenhead Docks (£1,000,000); chief engineer, Mersey Docks and Harbour Board, Pierhead, Liverpool, 3.

London.—POPLAR.—Eight-storey block of 73 flats, Teviot Street; W. J. Rankin, architect, Town Hall, Bow Road.

ST. MARYLEBONE.—Four-storey block of 23 flats, St. John's Wood Road; Easton & Robertson, architects, 54, Bedford Square, W.C.1.

CHARING CROSS ROAD.—Office block for Government of India; De Metz & Birks, architects, 2, Ludgate Hill, E.C.4.

OXFORD STREET.—Showrooms and offices; Montague Burton, Ltd., Hudson Road Mills, Leeds.

WESTMINSTER.—Six blocks of flats, Pimlico estate, for City Council; Powell & Moya, architects, 36, Great Smith Street, S.W.1.

Longridge.—Public hall for U.D.C. (£15,000); F. K. Emerson, surveyor, Council Offices, Market Place.

Maidenhead.—Three-storey block of flats, Braywick Lodge site; borough engineer.

Manchester.—Three-storey building for F. T. Morrell & Co., Pendleton & Dickinson, architects, 16, Brazennose Street.

Office block, Barton, for Shell-Mex & B.P., Ltd.; Fred Mitchell & Son, Ltd., builders, River Place, Hulme, Manchester, 15.

Milnthorpe.—County primary school for Westmorland C.C.; P. A. Baines & Sons (Northern), Ltd., Culgaith, Penrith.

Neath.—Houses (42), Westernmoor estate; borough engineer, Gwyn Hall.

Newark.—Twelve flats and 26 houses, Winthorpe Road; borough surveyor.

Newbiggin-by-the-Sea.—Houses (136), Spital Farm site; J. Kailofer, surveyor, U.D.C. Offices.

Newcastle-under-Lyme. — Church, Clayton; Rev. A. Gates, Congregational Church.

Houses (18), Hereford Avenue (£19,882); Joseph Jones (N.S.), Ltd., builders, Liverpool Road.

Oldham.—Day nursery, Honeywell Lane (£7,620); James Ridyard & Sons, Ltd., builders, Railway Saw Mills, Ashton-under-Lyne.

Oxford. — Nuffield College buildings; Harrison, Barnes & Hubbard, architects, 3, Southampton Place, W.C.1.

Houses (124) Barton estate, for T.C.; John Laing & Son, Ltd., builders, Mill Hill, N.W.7.

Plymouth.—Factory, etc., premises, Cattedown Industrial Estate; Stuart Photo Services, Ltd., Higher Rose Row, Redruth.

Portsmouth.—College of art, Park Road (£70,000); city engineer, 1, Clarence Parade, Southsea.

Rowley Regis.—Houses (58), Brickhouse Farm site; borough engineer, Municipal Buildings, Old Hill, Cradley Heath, Staffs.

Staines. — Houses (650), Stanwell site; Ministry of Civil Aviation, Ariel House, Strand, W.C.2.

Stockport.—Houses and flats, Bloomfield Drive (£65,621); H. Owen & Sons, Ltd., builders, 431, Buxton Road, Great Moor.

Swansea. — Modern bakery, Pontardulais Road, Fforestfach; Edward Dean & Sons (Millers), Ltd.

Tursdale (Co. Durham).—Pit-head baths; Mines Welfare Department, Old Queen Street, London, S.W.1.

West Bromwich. — Extensions to Birmid Works, Birmingham Road; Dartmouth Auto Castings, Ltd., Dartmouth Road, Smethwick.

Houses (50), Newtown estate; S. J. Smith & Co. (Bidford), Ltd., builders, Smith Road, Wednesbury.